

# ***STP Quarterly Review***

**21 January 2011**

**1QFY10**



**Dr. William F. Denig, Chief  
Solar & Terrestrial Physics Division**

**NOAA/NESDIS/NGDC**

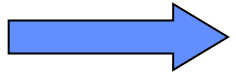
**303 497-6323**

**[William.Denig@noaa.gov](mailto:William.Denig@noaa.gov)**



# OUTLINE

## Solar & Terrestrial Physics Division



### **STP Program Overview**

**Milestones & Performance Measures**

**Awards & Personal Achievements**

**Accomplishments**

**Special Interest Items**

**Space Weather Deep Dive**

**Issues & Summary**



# Solar & Terrestrial Physics Division Personnel



## Solar & Terrestrial Physics Division

William Denig/F, Chief

Janet Brown/F, Secretary

Karen Horan/F, Physical Science Tech

Craig Clark/F, Scientific Data Tech

### Earth Observation Group (EOG)

#### Chris Elvidge/F, Team Lead

- Kim Baugh/C
- Tilottama Ghosh/C
- Daniel Ziskin/C
- Sharolyn Anderson/C

### Space Environment Group (SEG)

#### Vacant/F, Team Lead

- Terry Bullett/C
- Ray Conkright/C
- Ed Erwin/F
- Rob Redmon/F
- Dan Wilkinson/F
- Jim Manley/C
- Pat Purcell/C
- Paul Meade/CPI @ NGDC
- Peter Elespuru/C
- Anu Sundaravel/C
- Janet Machol/C @ SWPC
- John Schminky/S
- Preeti Bhaneja/C
- Dominic Fuller-Rowell/S

### Earth Geophysics Group (EGG)

#### Vacant/F, Team Lead

- Patrick Alken/C
- Rob Prentice/C
- Fran Coloma/C
- Justin Mabie/C
- Don Herzog (MGG)/C

#### Key

F – Federal

C – CIRES/CIRA

S – Student

G – Guest Scientist



# STP Division Overview

## Personnel Changes



- **Gains**
  - Sharolyn Anderson – EOG Research Scientist
- **Losses**
  - Eric Kihn, Promoted to Deputy Director, NGDC
  - Kelly Prendergast, Promoted to Chief, ISD
  - Sara Crepinsek, Temporary – Found other employment within DSRC
- **Re-Assignments**
  - Tilo Ghosh – CIRES working remotely from India
- **Vacancies**
  - GNSS Data Manager – Paperwork in progress
  - *TBD*
- **Inbound**
  - None
- **Outbound**
  - Ed Erwin – Retiring effective 31 March 2011



# STP Division Overview

## External Funding – FY11



STP Funding Sources				
Agency	Program	Group	Amount (\$K)	Status
NOAA	Climate Database Modernization Program (CDMP)	EOG	84	Confirmed
USAF	National Air & Space Information Center (NASIC)	EOG	100	Confirmed
NASA	Carbon Project	EOG	25	Confirmed
World Bank	World Bank (Incrementally Billed)	EOG	92	Confirmed
JAPAN	Ministry of Agriculture, Forestry and Fisheries (MAFF)	EOG	22	Confirmed
KOREA	National Fisheries Research and Development Institute (NFRDI)	EOG	8	Confirmed
CIA	Central Intelligence Agency	EOG	100	Planned
NOAA	Comprehensive Large Array-data Stew ards hip System (CLASS)	SEG		??
NOAA	NPOESS SEM-N Algorithm Development	SEG	160	Confirmed
NOAA	NOAA Virtual Data System (NVDS)	SEG		??
NOAA	Geostationary Operational Environmental Satellites (GOES-R) - Risk Reduction <sup>1</sup>	SEG	157	Planned
NOAA	Climate Database Modernization Program (CDMP)	SEG	24	Planned
NOAA	Continuously Operating Reference Stations (CORS) West Operations	EGG	298	Confirmed
NOAA	Climate Database Modernization Program (CDMP)	SEG	36	Planned
NOAA	Climate Database Modernization Program (CDMP)	EGG	6	Planned
			1,112	
Status Key:			As of:	14-Jan-11
Received	Monies have been received in-house			
Confirmed	Funding agency has identified funds			
Planned	Identified funding amounts either proposed or planned			
Invoiced	Invoice sent or in process			
Note:	<sup>1</sup> Includes ISD support (Habermann & company)			

**Does not include:**

**Forward-funded obligations for SEM-N (~\$1M)**  
**Direct CIRES support to Terry Bullett (~\$525K)**



# STP Division Overview

## Agreements – Status



### STATUS

Scope	Team	Type	Partner	NOAA Legal	DOC Legal	NGDC Signed	Partner Signed	Start	End	Status	
CORS Support	EGG	AGR	NGS	n/a	n/a	X	X	01-Oct-03	30-Sep-09	G	In place - nothing to report
SWx Climatology	SEG	MOU	AFCCC	X	X	X	X	27-May-04	01-Oct-14	G	In place - <i>no FY10 activity</i>
GPS Data (CORS)	EGG	MOA	Multi	n/a	n/a	X	X	20-Sep-04	30-Sep-10	G	In place - <i>new MOA in process</i>
NASIC	EOG	MOU	NASIC	X	X	X	X	09-Mar-06	01-Jan-11	G	Expired
NASIC	EOG	MOU	NASIC	X				TBD	TBD	Y	<i>New MOA in process</i>
Ionospheric Data	SEG	MOU	AFWA	X	X	X	X	21-Aug-06	21-Aug-11	G	In place - <i>no FY10 activity</i>
DMSP Archive	SEG	MOA	DMSP	X	X	X	X	30-May-07	30-Sep-09	Y	<i>Expired - Need kick start</i>
ViRBO	SEG	MOA	NASA	X	X	X	X	15-Apr-09	n/a	G	In place - <i>no FY10 activity</i>
Ionosonde Sites	SEG	IA	USGS	X	X	X	X	03-Apr-09	03-Apr-14	G	In place - nothing to report
SEM-N - AFRL	SEG	MOA	AFRL	X	X	X	X	11-May-09	11-May-14	G	In place - nothing to report
Nighttime Lights	EOG	MOU	DOE	X	X	X	X	12-Aug-09	12-Aug-13	G	In place - nothing to report
Gas Flaring	EOG	SA	WBank	X	X	X	X	4/6/2010	31-Dec-14	G	In place - nothing to report
SEM-N Algorithms	SEG	MOU	SMC					TBD	TBD	Y	<i>New MOA - awaiting SMC feedback</i>
											As of: 14 Jan 1



# STP Division Overview

## CDMP – Status



### STATUS

Dataset	Funded in FY10	Proposed for FY11	POC	Contractor (\$K) - FY10	Contractor (\$K) - Expended YTD	NGDC - FY10 (\$K)	NGDC - FY11 (\$K) Proposed
DMSP Film Scanning (L3)	√	√	Elvidge	466.0	389.3	42.5	40.0
Historical Ionosonde Records (L7)	√	√	Redmon	90.0	54.9	9.0	13.8
Historical Solar Observations (L18)	√	√	Horan	55.0	48.4	3.0	6.0
Cosmic rays - Forbush archives (L42)	√	√	Denig	205.0	176.3	8.0	8.5
Heat Capacity Mapping Mission (L44)	√	√	Elvidge	50.0	0.2	5.0	4.0
NGS Multi-Lens (L50)	√	√	Elvidge	175.0	84.9	27.5	40.0
Ionosonde Paper Record Project (L55)	√	√	Redmon	40.0	2.4	4.0	8.0
Geomagnetic Variation Digitization (L56)	√	√	Mabie	60.0	15.7	6.0	15.0
							As of: 14 Jan 2011

**Total STP FY11 proposed funding from CDMP is \$135.5K**

▴ Indicates additional funding added





# STP Division Overview

## GOES Spacecraft/Instrument Status



Spacecraft	Series	Operational Status	Status	Magnet1	Magnet2	Magnetometer 1	Magnetometer 2	MAG	XRS	XRS-EUV	EXIS	EPS	HEPAD	SEISS	XRP	SXI	SUVI
GOES 8	GOES I-M	Decommisioned	R	G	G				G			G	G		G		
GOES 9	GOES I-M	Decommisioned	R	G	G				G			G	G		G		
GOES 10	GOES I-M	Decommisioned	R	G	G				G			Y	G		G		
GOES 11	GOES I-M	Operational West	G	G	G				R			G	G		R		
GOES 12	GOES I-M	South America	G	G	G				R			Y			R	R	
GOES 13	GOES N-O-P	Operational East	G			G	G			O		G	G			O	
GOES 14	GOES N-O-P	Standby	G			G	G			G		G	G			G	
GOES 15	GOES N-O-P	Standby	G			G	G			G		G	G			G	
GOES R	GOES R	Acquisition						TBD			TBD			TBD			TBD
GOES S	GOES R	Acquisition						TBD			TBD			TBD			TBD

As of: 14 Jan 11

Operational (or capable of)	G
Operational with limitations (or Standby)	Y
Operational with Degraded Performance	O
Not Operational	R
Status Unknown	TBD

*Note: GOES-15 XRS-EUV & SXI currently used for SWPC operations. All available GOES and POES Space Weather data flowing into the archive<sup>1</sup>.*





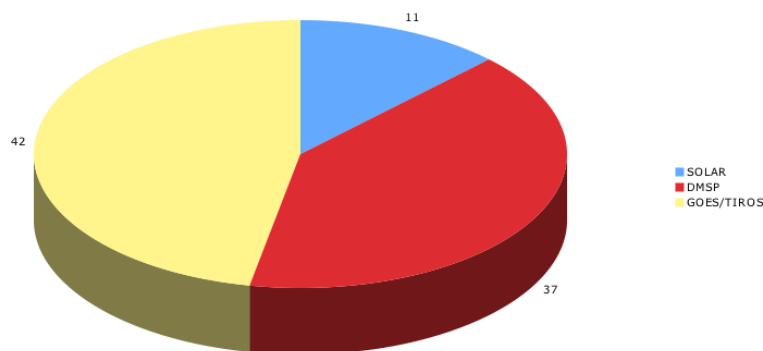


# STP Division Overview

## Tivoli Mound



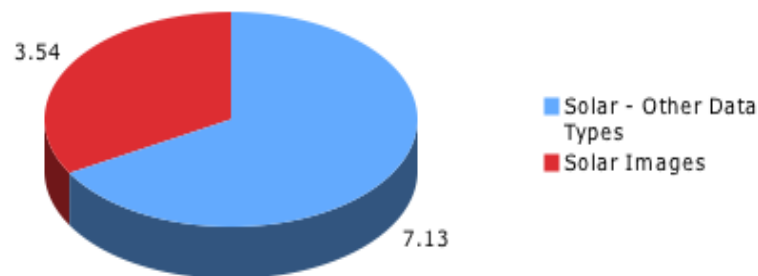
Remaining STP Data in the Tivoli Mound (GB)



**1QFY10**

**Total Size: 90 GB**

Remaining STP Data in the Tivoli Mound (GB)



**1QFY11**

**Total Size: 11 GB**

	1QFY10	1QFY11
Solar	11 GB	11 GB
DMSP_SWx	37 GB	
GOES/Tiros	42 GB	
Total	90 GB	11 GB

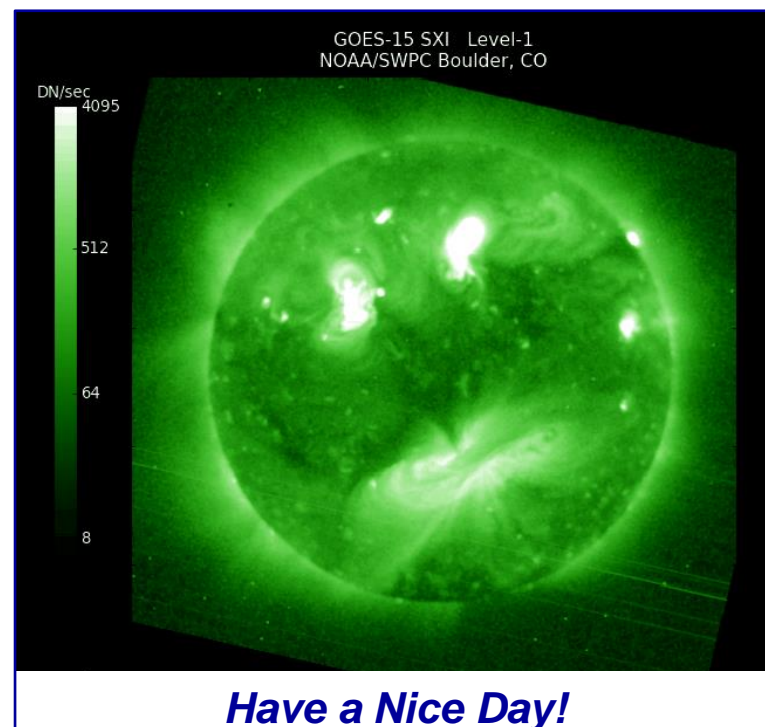
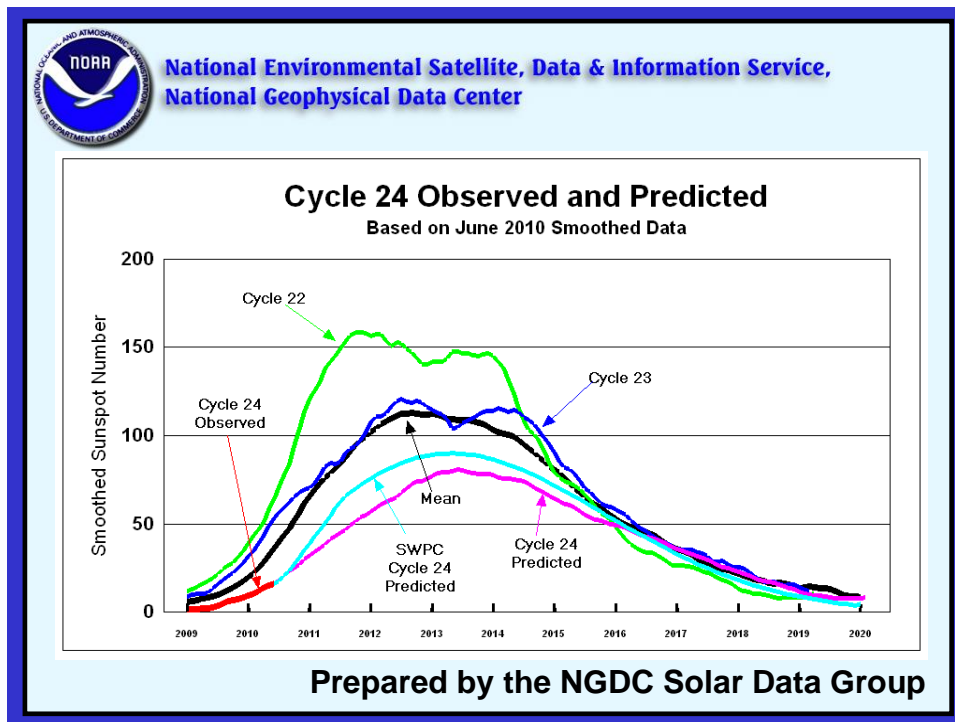


# STP Division Overview

## Current Solar Maximum Predictions



The solar cycle continues a slow rise towards a predicted Solar Maximum in 2013. The sun remains generally quiet with only a few non-eruptive sunspot groups visible on the solar disk. The polar magnetic fields during the recent extreme solar minimum were abnormally weak and may be the cause of the slow ramp-up to a modest solar max.



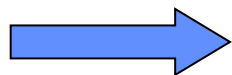


# OUTLINE

## Solar & Terrestrial Physics Division



### **STP Program Overview**



### **Milestones & Performance Measures**

### **Awards & Personal Achievements**

### **Accomplishments**

### **Special Interest Items**

### **Space Weather Deep Dive**

### **Issues & Summary**



# FY10 Milestones STP



PPBES Program	STP FY10 Milestones (Proposed)	Status	Planned Completion Date	Actual Completion Date	Responsible Person
Space Weather	Provide archive and access for the Space Weather Prediction Center (SWPC) operational D-Region Absorption Prediction (D-RAP) product	C	(Q1) 12/31/2009	(Q1) 12/8/2009	Prendergast
Space Weather	Conduct an Algorithm Requirements Review (ARR) for the Space Environment Monitor on the National Polar-orbiting Operational Environmental Satellite System (NPOESS).	C	(Q1) 12/31/2009	(Q1) 11/17/2009	Manley
Marine Transportation Systems	Develop a satellite-derived global map of economic activity for 2006 using nighttime earth imagery data from the Defense Meteorological Satellite Program (DMSP).	C	(Q2) 3/31/2010	(Q2) 3/31/2010	Ghosh
AOP → Space Weather	Ingest into the official archives "out of cycle" operational X-Ray Sensor (XRS) data when available for the Geostationary Operational Environmental Satellite number 14 (GOES 14)	C	(Q2) 3/31/2010	(Q2) 3/31/2010	Wilkinson
Geodesy	Reconcile the Global Positioning System (GPS) data holdings between the Continuously Operating Reference Stations (CORS) East and CORS West mirror sites.	Y <sup>1</sup>	(Q3) 6/30/2010	Pending NGS Coordination	Coloma
Marine Transportation Systems	Complete version 4 of the Defense Meteorological Satellite Program (DMSP) Operational Linescan System (OLS) annual stable nighttime lights covering the period 1992 to 2009.	C	(Q3) 6/30/2010	(Q3) 6/5/2010	Elvidge
Space Weather	Develop a workflow client for the Space Physics Interactive Data Resource (SPIDR) to streamline user delivery of NOAA's space environmental data.	C	(Q3) 6/30/2010	(Q3) 6/30/2010	Elespuru
AOP → Space Weather	Develop a comprehensive plan for porting Space Weather Prediction Center (SWPC) data holdings to NGDC including maintaining current Frodo access capabilities.	C	(Q4) 9/30/2010	(Q4) 9/9/2010	Prendergast
Space Weather	Develop a public interface to the complete Ionosonde data catalog within the NGDC Official Archives.	C	(Q4) 9/30/2010	(Q4) 9/2/2010	Redmon
Space Weather	Develop a prototype system for the NOAA Enterprise Archive Access Tool (NEAAT) for the Comprehensive Large Array-data Stewardship System (CLASS).	C	(Q4) 9/30/2010	(Q4) 9/9/2010	Kihn
AOP → Space Weather	Complete the metadata records using available data for the solar and space environmental sensors on the Geostationary Operational Environmental Satellite (GOES) N-O-P spacecraft	C	(Q4) 9/30/2010	(Q4) 8/25/2010	Wilkinson
<sup>1</sup> Recommend deletion - NGS concurrence					As of 14 Jan 2011

AOP → AOP milestone

**C** Complete  
**G** On-track

**Y** Watch Item  
**R** Issue



# FY10 Milestone – AOP

## NWS SWx Archive Requirements

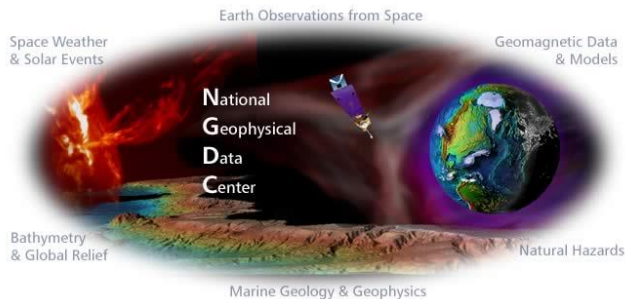


U.S. Department of Commerce  
National Oceanic and Atmospheric Administration (NOAA)  
National Environmental Satellite, Data, and Information Service (NESDIS)

### Functional Requirements For Access to NGDC Space Weather Archives and Stores

Including Access, Search, Display, Order and Dissemination

9/09/2010



#### Prepared by:

- Kelly Prendergast, NGDC/STP
- Rodney Viereck, NWS/SWPC

**Milestone** – Develop a comprehensive plan for porting Space Weather Prediction Center (SWPC) data holdings to NGDC including maintaining current Frodo access capabilities.

**Background** – Representatives from SWPC and NGDC have developed a comprehensive set of requirements for SWPC access to historical space weather (SWx) data and supporting metadata. Four (4) use cases were examined to help develop functional requirements for supporting SWPC operations and the research-to-operations (R2O) of new space environmental models.

#### Completion Date:

Planned: (FY10-4Q)

30Sep10

Actual : (FY10-4Q)

09Sep10

**Significance** – SWPC maintains an extensive collection of space environmental data from NOAA satellites and other supporting systems that is better suited for data stewardship within NGDC. As SWPC evolves into a more traditional NWS weather office it is prepared to increase its reliance on the NOAA data centers.



# FY10 Milestone

## Public Interface for Ionosonde Catalog



**Milestone** – Develop a public interface to the complete Ionosonde data catalog within the NGDC Official Archives.

**Background** – The NGDC digital archives include ionospheric data from 1939 to present.

**Completion Data** – Planned (FY10-4Q): 30Sep10 / Actual (FY10-4Q): 02Sep10

**Significance** – This archive search capability is of value to climate researchers and other space scientists.

NOAA > NESDIS > NGDC > solar-terrestrial physics

### Ionospheric Inventory

Hourly Summaries

[Guided Hourly Summary](#)

[Advanced Hourly Summary](#)

Additional Inventories

[Film Inventory](#)

[SPIDR Characteristics](#)

[Online Manifests Yearly](#)

[Online Manifests Daily](#)

[Archive Manifests](#)

Introduction

The Master Ionosonde Data Set (MIDS) Ionosonde Inventory, is an inventory of all individual ionosonde soundings managed by the National Geophysical Data Center (NGDC). This interface offers both an interactive form based, and REST based access points to the inventory. Using the highly flexible forms triggered by the buttons to the left, you will be able to construct a query against this catalog tailored to your specific needs. The query that results provides you a complete URL which can be shared with colleagues and whose parameters can be adjusted at any time. Presently, the inventory supports a colored summary of ionosonde records along with links to the corresponding data available online.

Contact [Rob Redmon](#) for scientific questions and data requests, or [Peter Elespuru](#) for questions about the website or query interface.

Query Interface Summary

The query interface has 6 parameters:

- report
- station
- extension
- contentType
- dateFrom
- dateTo

The report parameter currently supports 3 values, of which 1 is active (hourly), 'hourly', 'daily', 'monthly'. The full set of allowed values for the station, extension and contentType parameters are shown in the forms accessed by the buttons on the left. The dateFrom and dateTo parameters accept and can parse a date in many different formats. If you specify something invalid you'll be notified, but some examples are 'YYYY-MM-DD HH:MM:SS' and 'Sun%20Aug%2008%202010%2000:00:00%20GMT-0600%20(MDT)' spaces and other special characters will be accepted whether or not you URI encode them, such as space = %20 as an encoded value.

For example, to generate a table of inventory holdings for the BC840 station, SAO extension, of scaled content type, you would form a query like the following and provide this after the initial http://... after 'inventory', as http://.../inventory/iono?... which becomes [http://spidr.ngdc.noaa.gov/80/inventory/iono?report=hourly&station=BC840&extension=SAO&contentType=scaled&dateFrom=Sun%20Aug%202010%2000:00:00%20GMT-0600%20\(MDT\)&dateTo=Sun%20Aug%2008%202010%2000:00:00%20GMT-0600%20\(MDT\)](http://spidr.ngdc.noaa.gov/80/inventory/iono?report=hourly&station=BC840&extension=SAO&contentType=scaled&dateFrom=Sun%20Aug%202010%2000:00:00%20GMT-0600%20(MDT)&dateTo=Sun%20Aug%2008%202010%2000:00:00%20GMT-0600%20(MDT))

Day of Year	213		214		215		216		217		218		219		220	
Totals (disk/archive)	d:96	a:96	d:96	a:96	d:96	a:96	d:96	a:96	d:96	a:96	d:96	a:96	d:96	a:96	d:4	a:4
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0 0 0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0 0 0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0 0 0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0 0 0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0 0 0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0 0 0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0 0 0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0 0 0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0 0 0
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19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	0 0 0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0 0 0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	0 0 0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	0 0 0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	0 0 0





# FY10 Milestone

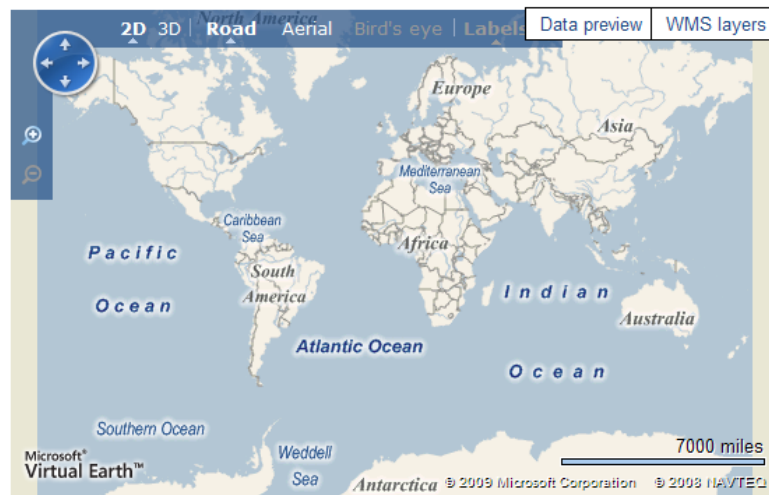
## NOAA Enterprise Archive Access Tool



### Detailed CLASS data request for: Marine Geology Data

#### Location map

Left click map to add point of interest. Left click existing point to remove it.  
Move mouse with pressed left button to select region.



ROI:

#### Parameters

Continents  
ETOP02/MODIS Relief  
Relief from wsearth image  
NOS Bottom Type

WMS layers

10 Resolution (px per deg) Data resolution

png Image format format

#### Action

**Milestone** – Develop a prototype system for the NOAA Enterprise Archive Access Tool (NEAAT) for the Comprehensive Large Array-data Stewardship System (CLASS).

**Background** – The NGDC CLASS development group has delivered the prototype NEAAT tool to CLASS for operational implementation. Recent upgrades to NEAAT include non-granule based asynchronous data extractions from CLASS, operational functionality to OGSA-DAI 3.0, and improved capabilities to cover more NOAA and non-NOAA data types and services.

#### Completion Date:

Planned: (FY10-4Q) 30Sep10

Actual: (FY10-4Q) 09Sep10

**Significance** – NEAAT is an advanced interface to CLASS that will facilitate user access to NOAA environmental datasets and products with the associated metadata.





# FY10 Milestone – AOP GOES N-O-P Metadata



**Milestone** – Complete the metadata records using available data for the solar and space environmental sensors on the Geostationary Operational Environmental Satellite (GOES) N-O-P spacecraft.

**Background** – GOES N-O-P Space Environment Monitor (SEM) includes significant changes over previous generations which therefore requires new metadata. A key metadata component for GOES N-O-P is a master data attribute table containing over 1000 entries used operationally to standardize documentation, data products and quality control plots.

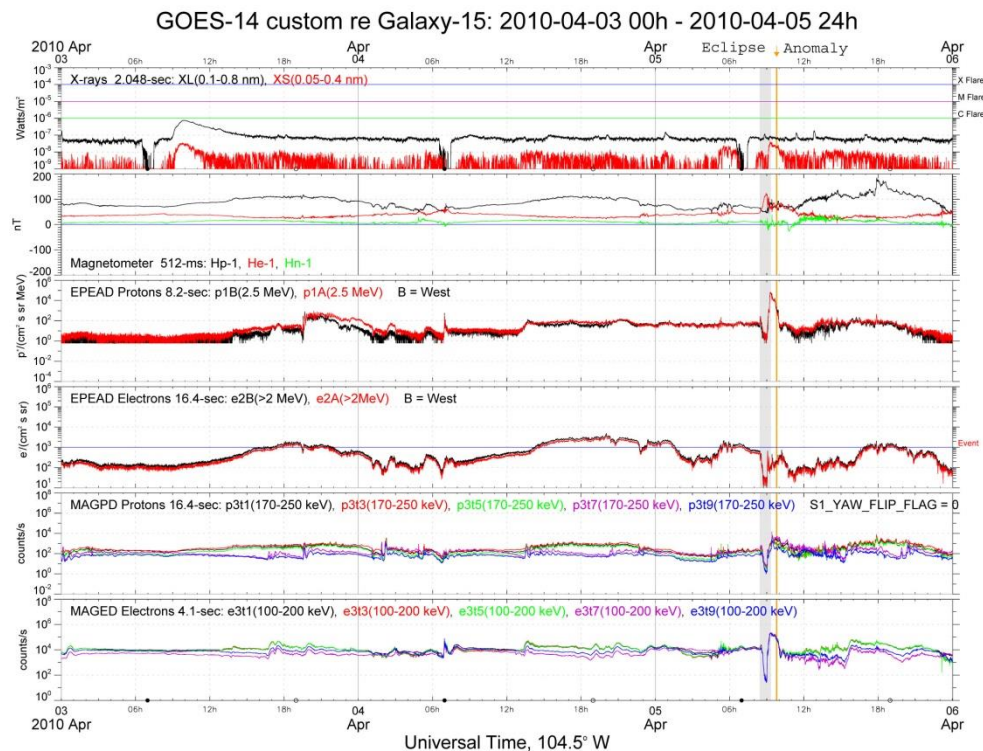
## Completion Date:

Planned: (FY10-4Q) 30Sep10

Actual: (FY10-4Q) 25Aug10

**Significance** – The complexity and breadth of the GOES N-O-P space weather data products requires advanced techniques to ensure the quality and consistency of NOAA's environmental datasets. In order to effectively serve current N-O-P data products and to prepare for the next-generation GOES-R the metadata records for NOAA satellite data need to be comprehensive, accurate and straightforward to use.

1QFY11 PMR – 21 Jan 2011





# Milestones & Performance Measures

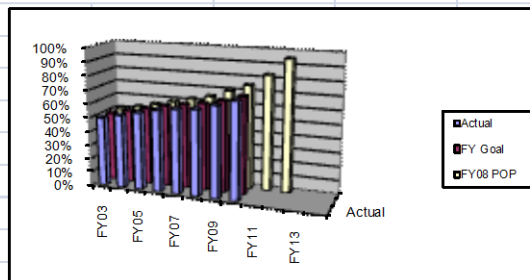
## FY10 Performance Measures



### Performance Measures

#### 1 - Percentage of archived SWx data available to the public on-line

	Actual	FY Goal	FY08 POP
FY03	50%	50%	50%
FY04	53%	53%	53%
FY05	56%	56%	56%
FY06	59%	59%	59%
FY07	61%	61%	62%
FY08	62%	63%	65%
FY09	66%	66%	70%
FY10	70%	70%	75%
FY11			83%
FY12			95%
FY13			
FY14			

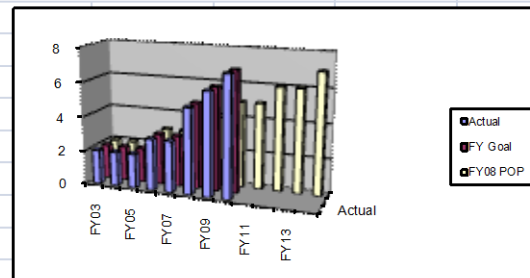


#### Current Month: Sept 2010

This Q	Actual	FY10
Planned	This Q/Total	Target
70%	70%	70%

#### 2 - Improved retrospective products for understanding the space environment

	Actual	FY Goal	FY08 POP
FY03	2	2	2
FY04	2	2	2
FY05	2	2	2
FY06	3	3	3
FY07	3	3	3
FY08	5	5	4
FY09	6	6	4
FY10	7	7	5
FY11			5
FY12			6
FY13			6
FY14			7



#### Current Month: Sept 2010

This Q	Actual	FY10
Planned	This Q/Total	Target
7	7	7

As of: 15 Jan 11

The FY2008 Program Baseline Assessment (FY08 PBA) was released 08 June 2005.



# NOAA



## Next Generation Strategic Plan (NGSP)



Download at: <http://www.ppi.noaa.gov/ngsp.html>



# FY11 Milestones STP



LO	Goal	Objective	Milestone			Due	Completed	POC
NOS	Resilient Coastal Communities and Economies (NOS)	Safe, Efficient and Environmentally Sound Marine Transportation	Acquire available definitive geomagnetic data from the INTERMAGNET consortium for 2009 including data from over 100 magnetic observatories	G		4QFY11 30-Sep-2011		Mabie
CS	Climate Adaptation and Mitigation (CS)	Improved Scientific Understanding of the Changing Climate System and Its Impacts	Prepare and submit a white paper to the National Research Council on the need for continuous satellite measurements to maintain the Total Solar Irradiance (TSI) Climate Data Record (CDR)	C		1QFY11 30-Dec-2010	1QFY11 12-Nov-2010	Denig
			Calculate national and global gas flaring volumes for 2010 using available imagery data from the Defense Meteorological Satellite Program (DMSP)	G		2QFY11 31-Mar-2011		Elvidge
			Complete and release the year 2010 radiance calibrated nighttime lights product	G		3QFY11 30-Jun-2011		Elvidge
NWS	Weather-Ready Nation (NWS)	A More Productive and Efficient Economy Through Environmental Information Relevant to Key Sectors of the U.S. Economy	Complete the historical data rescue of solar synoptic drawings for years 1972 to 2009 prepared by the NOAA Space Weather Prediction Center and predecessor organizations.	C		1QFY11 30-Dec-2010	1QFY11 01-Nov-2010	Horan
			Deliver to the NWS Space Weather Prediction Center a transition ready version of the Ovation Prime aurora product	C	AOP	1QFY11 30-Dec-2010	1QFY11 10-Dec-2010	Redmon
			Produce a Concept of Operations for the archive, access and assessment of the GOES N-O-P Space Environment Monitor (SEM) data from the NESDIS OSDPD	G		2QFY11 31-Mar-2011		Wilkinson
			Develop and deliver a science-grade software product to compute ionospheric electric fields for the Swarm satellite constellation mission	G		2QFY11 31-Mar-2011		Alken
			Develop a master plan for the NGDC solar program identifying all current organizational interfaces tied to the NMMR metadata repository	Y		3QFY11 30-Jun-2011		Erwin
			Release new Auroral Resources page facilitating visualization of and access to space weather datasets available through NGDC	G		3QFY11 30-Jun-2011		Redmon
			Deliver to the Defense Weather Satellite System (DWSS) Program Office updated Algorithm Theoretical Basis Documents for the Space Environment Monitor - Next (SEM-N) sensor	G		4QFY11 30-Sep-2011		Purcell
			Digitize and make available on-line the complete set of Solar-Geophysical Data reports for 1955 to 2009 prepared by the NGDC Solar Data Services group	G	AOP	4QFY11 30-Sep-2011		Clark

As of 21 Jan 11

**C** Complete  
**G** On-track

**Y** Watch Item  
**R** Issue





# FY11 Milestone

## Archiving NOAA Solar Synoptic Drawings



**Milestone** – Complete the historical data rescue of solar synoptic drawings for years 1972 to 2009 prepared by the NOAA Space Weather Prediction Center and predecessor organizations.

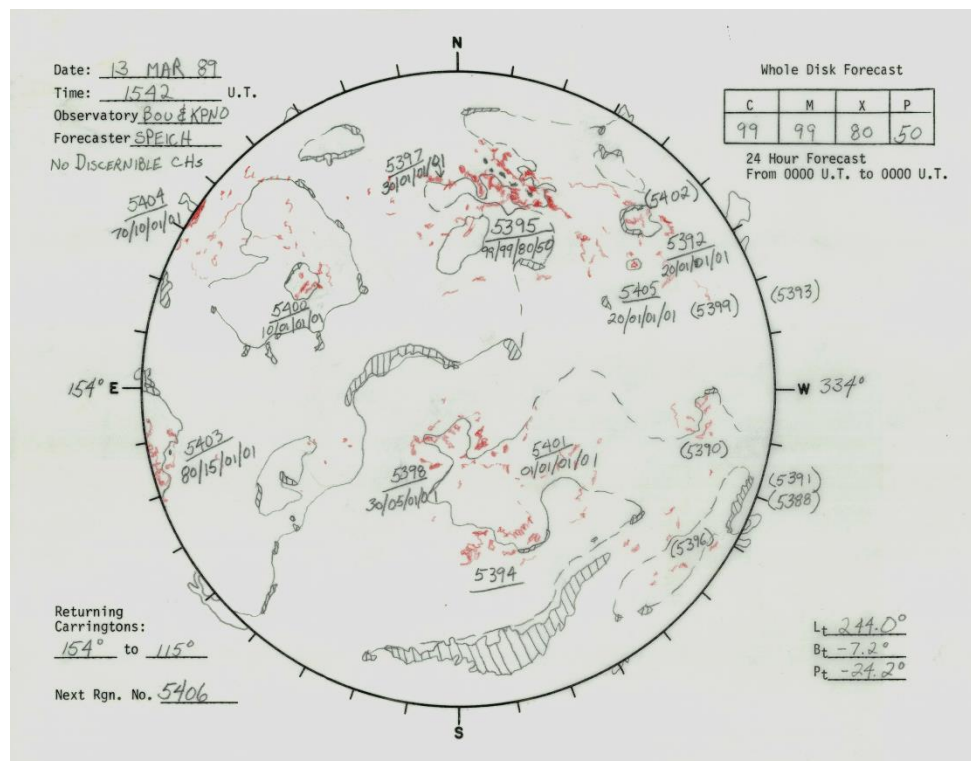
**Background** – Almost 50 years worth of daily full-sun drawings from the NOAA/SWPC have been digitized through the NOAA Climate Data Modernization Program (CDMP). Various solar features are detailed in these drawings including sunspot regions, filaments, plagues, prominences and coronal holes. These drawings were painstakingly prepared by the NOAA space weather operations officers but have never before been publically available.

### Completion Date:

Planned: (FY11-1Q) 30Dec10

Actual: (FY11-1Q) 01Nov10

**Significance** – This historical solar drawings overlap other observational datasets available through NGDC to compare and contrast. The drawing on the right is from March 13, 1989.





# FY11 Milestone

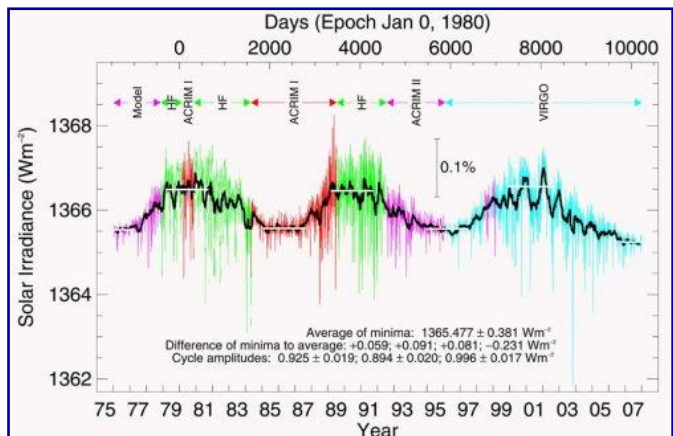
## White Paper for the NRC Decadal Survey



### THE NATIONAL ACADEMIES

*Advisers to the Nation on Science, Engineering, and Medicine*

#### ***The Total and Spectral Irradiance Sensor***



**Contributed by:**

**P. Pilewskie, G. Kopp, E. Richard, CU/LASP**

**R. Cahalan, NASA/GSFC**

**W. Denig, NOAA/NGDC/STP**

Background: Radiative energy from the sun establishes the basic climate of the earth's surface and atmosphere and defines the terrestrial environment that is humanity's habitat. The current uninterrupted 32-year climate data record (CDR) for total solar irradiance (TSI) exhibits variability over the 11-year solar cycle and on even shorter time scales.

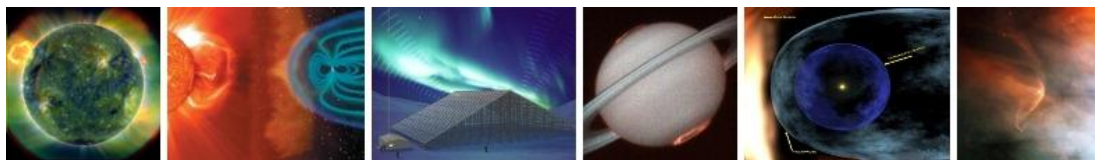
#### Issue:

- A timely 2014 launch of the JPSS/TSIS is required to continue the CDR for TSI
- Measurement of solar spectral irradiance is vital for understanding how solar variability affects climate and for validating climate models

See the [Decadal Survey Website](http://www8.nationalacademies.org/SSBSurvey/publicviewHeliophysics.aspx)

White paper posted at:

["http://www8.nationalacademies.org/SSBSurvey/publicviewHeliophysics.aspx".](http://www8.nationalacademies.org/SSBSurvey/publicviewHeliophysics.aspx)





# FY11 Milestone – AOP

## Transition-ready Ovation Prime



**Milestone** – Deliver to the NWS Space Weather Prediction Center (SWPC) a transition ready version of the Ovation Prime auroral product.

**Goal:** Weather Ready Nation (NWS)

**Objective:** A More Productive and Efficient Economy Through Environmental Information Relevant to Key Sectors of the U.S. Economy

**Planned Completion:** (1QFY11) 30 Dec 2010

**Actual:** (1QFY11) 10 Dec 2010

**Background** – NGDC has adapted the retrospective Ovation Prime auroral product for operational transition to the NWS/SWPC. Ovation Prime uses ACE solar wind data to provide a 30-minute to 1-hour forecast of high-latitude auroral conditions. The predictive algorithm was developed by JHU/Applied Physics Laboratory using solar wind data and DMSP observations.

**Significance** – Ovation Prime adapted for use by the commercial airline industry and power-grid operators.



1QFY11 PMR – 21 Jan 2011











# Milestones & Performance Measures

## FY11 Performance Measures



STP Annual Performance Measures									
<b>Space Weather - AOP</b>									
LO	Goal	Objective	Performance Measure	POC	1QFY11	2QFY11	3QFY11	4QFY11	Annual
NWS	Weather-Ready Nation (NWS)	A More Productive and Efficient Economy Through Environmental Information Relevant to Key Sectors of the U.S. Economy	Greater than 97% (2 sigma) of available Space Environment Monitor satellite data are archived on an annual basis	Wilkinson	100%				
<b>Nighttime Lights</b>									
LO	Goal	Objective	Performance Measure	POC	1QFY11	2QFY11	3QFY11	4QFY11	Annual
CS	Climate Adaptation and Mitigation (CS)	Improved Scientific Understanding of the Changing Climate System and Its Impacts	Acquire, process and disseminate >2 sigma (97%) of available real-time nighttime lights imagery within 3 hours of receipt	Elvidge	100%				
<b>CORS</b>									
LO	Goal	Objective	Performance Measure	POC	1QFY11	2QFY11	3QFY11	4QFY11	Annual
NOS	Resilient Coastal Communities and Economics (NOS)	Resilient Coastal Communities That Can Adapt To The Impacts Of Hazards And Climate Change	Provide a >2 sigma (97%) availability for Continuously Operating Reference Station (CORS) near-real-time data to the NWS Space Weather Prediction Center as per the '4-way' Memorandum of Agreement and subject to normal business-hour response times.	Coloma	100%				

As of: 18 Jan 11

-  Greater than 99% (3-sigma) Cumulative Distribution
-  Greater than 97% (2-sigma) Cumulative Distribution
-  Greater than 84% (1-sigma) Cumulative Distribution
-  Below 84.1% (1-sigma) Cumulative Distribution

 Move to archive is awaiting finalization from SWPC



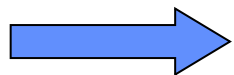
# **OUTLINE**

## **Solar & Terrestrial Physics Division**



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# AWARD

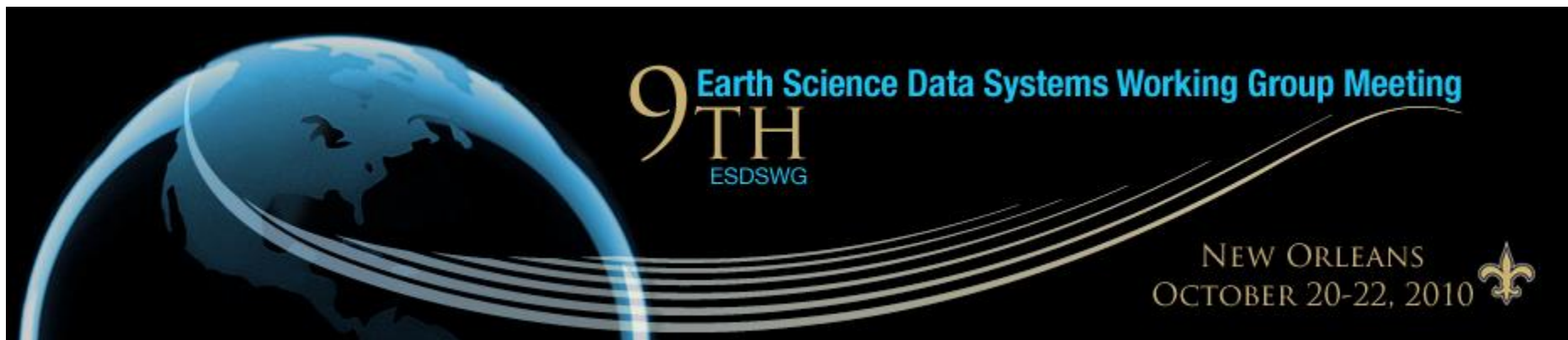
## Software Reuse Award



The NGDC Space Physics Interactive Data Resource (SPIDR) development team has won the **Peer-Recognition Software Reuse Award** by the NASA Earth Science Data Systems (ESDS) Software Reuse Working Group. The award was based on advancements to SPIDR including the use of RESTful services for access to NOAA environmental datasets and metadata. Award recipients are Eric Kihn, Rob Redmon, Peter Elespuru, Mikhail Zhizhin and Dmitry Medvedev. Peter Elespuru accepted the award on behalf of the team at the Earth Science Data Systems Working Group Meeting, 20-22 Oct 2010, New Orleans, LA.



Award Recipients (E. Kihn not shown)





# WELCOME

## Dr. Sharolyn Anderson



Dr. Sharolyn Anderson recently joined the Earth Observations Group (EOG) within STP. Dr. Anderson comes to NGDC from the University of Denver where she is currently an Assistant Professor in the Department of Geography. She did her Ph.D. work at Arizona State University. She also holds an M.S. in geography and B.S. in computer science both from the University of New Mexico. She has broad research interests including land-use and land-cover change (LUCC), urban growth modeling, assessment and monitoring of land degradation and deforestation, and, in particular, applying the theoretical base of geographic information science (GIS) within her work.

 UNIVERSITY OF DENVER





# MARRIED

## Dr. Tilo Ghosh

Dr. Tilottama (Tilo) Ghosh has now returned to India where she will continue to work remotely for CU/CIRES within the STP Earth Observation Group (EOG). On 15 Dec 2010 Tilo was married. Chris Elvidge was in attendance and “did not object”. She continues to be a productive researcher within the Nighttime Lights Program.



*Energies* **2010**, *3*, 1895–1913; doi:10.3390/en3121895

OPEN ACCESS

**energies**

ISSN 1996-1073

www.mdpi.com/journal/energies

Article

### Creating a Global Grid of Distributed Fossil Fuel CO<sub>2</sub> Emissions from Nighttime Satellite Imagery

Tilottama Ghosh <sup>1,\*</sup>, Christopher D. Elvidge <sup>2</sup>, Paul C. Sutton <sup>3</sup>, Kimberly E. Baugh <sup>1</sup>, Daniel Ziskin <sup>1</sup> and Benjamin T. Tuttle <sup>3</sup>

<sup>1</sup> Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, CO 80309, USA; E-Mails: kim.baugh@noaa.gov (K.E.B.); daniel.ziskin@noaa.gov (D.Z.)

<sup>2</sup> Earth Observation Group, Solar and Terrestrial Physics Division, NOAA National Geophysical Data Center, 325 Broadway, Boulder, CO 80305, USA; E-Mail: chris.elvidge@noaa.gov

<sup>3</sup> Department of Geography, University of Denver, Denver, CO 80208, USA; E-Mails: paul.sutton@du.edu (P.C.S.); btuttle@du.edu (B.T.T.)

\* Author to whom correspondence should be addressed; E-Mail: tilottama.ghosh@noaa.gov; Tel.: +1-303-497-6385; Fax: +1-303-497-6513.

Received: 21 November 2010; in revised form: 6 December 2010 / Accepted: 7 December 2010 / Published: 8 December 2010

**Abstract:** The potential use of satellite observed nighttime lights for estimating carbon-dioxide (CO<sub>2</sub>) emissions has been demonstrated in several previous studies. However, the procedures for a moderate resolution (1 km<sup>2</sup> grid cells) global map of fossil fuel CO<sub>2</sub> emissions based on nighttime lights are still in the developmental phase. We report on the development of a method for mapping distributed fossil fuel CO<sub>2</sub> emissions (excluding electric power utilities) at 30 arc-seconds or approximately 1 km<sup>2</sup> resolution using nighttime lights data collected by the Defense Meteorological Satellite Program's Operational Linescan System (DMSP-OLS). A regression model, Model 1, was initially developed based on carbon emissions from five sectors of the Vulcan data produced by the Purdue University and a nighttime satellite image of the U.S. The coefficient derived through Model 1 was applied to the global nighttime image but it resulted in underestimation of CO<sub>2</sub> emissions for most of the world's countries, and the states of the U.S. Thus, a second model, Model 2 was developed by allocating the distributed CO<sub>2</sub> emissions (excluding emissions from utilities) using a combination of DMSP-OLS nighttime image and population count data from the U.S. Department of Energy's (DOE) LandScan grid. The CO<sub>2</sub> emissions were distributed in proportion to the brightness of the



# **OUTLINE**

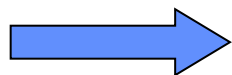
## **Solar & Terrestrial Physics Division**



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# Accomplishment

## Report on the Spacecraft Charging Meeting



The meeting report for the 11<sup>th</sup> Spacecraft Charging Technology Conference was provided by Bill Denig and colleagues and published in the recent issue of *Space Weather*. The report discussed the present state of the art for spacecraft charging including observations, laboratory simulations and satellite charging models. Dr. Denig reported at the meeting the results of the NOAA Tiger Team looking into the Galaxy 15 anomaly. Presentations from the meeting are available on the NGDC website.

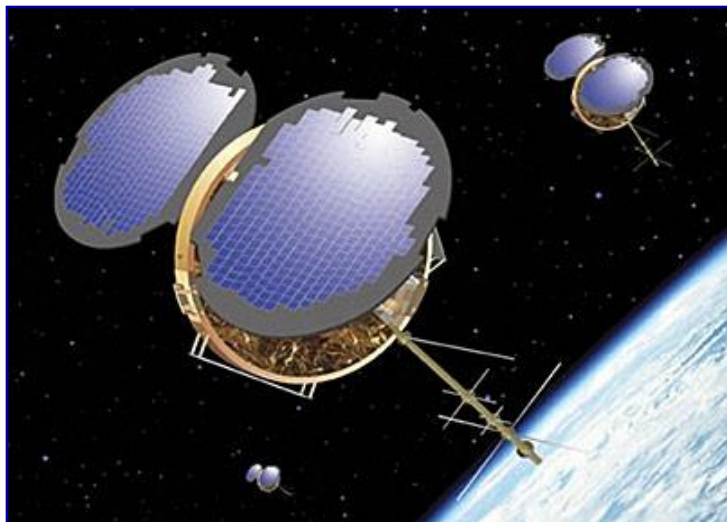




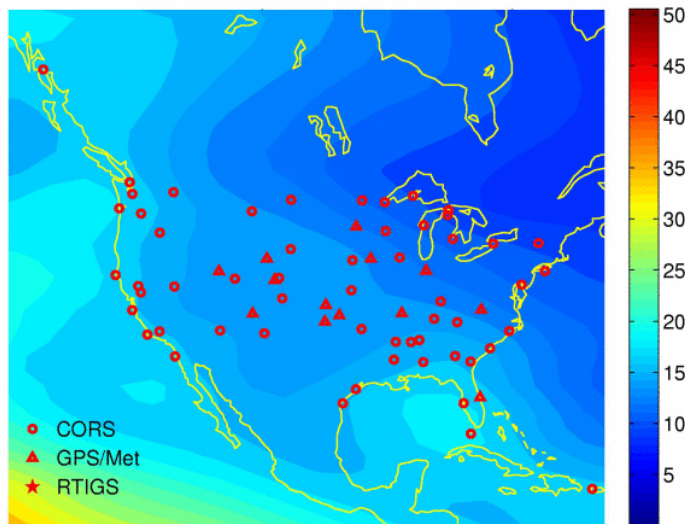


# Accomplishment

## Graduate Student Uncovers COSMIC Error



Total Electron Content Units  $\times 10^{16} \text{ m}^{-2}$



08-Dec-2010 from 21:45 to 22:00 UT

NOAA/SWPC Boulder, CO USA (op.ver: 1.0)

NGDC is investigating the possibility of running the U.S. Total Electron Content (TEC) in-house using retrospective data from the COSMIC satellite system in addition to other, ground-based, GPS data sources. The U.S. TEC model is currently used by the NWS Space Weather Prediction Center for ionospheric specifications and TEC corrections in geo-location algorithms.

Recently, Mr Dominic Fuller-Rowell (NGDC student) uncovered errors in the TEC values determined from COSMIC. Scientists from the University Corporation for Atmospheric Research (UCAR) have confirmed the problem and believe that the TEC errors, which occur under specific occultation circumstances, are related to receiver firmware issues. Engineers from the NASA Jet Propulsion Laboratory (JPL) have been notified.

NGDC is preparing to receive GPS/GNSS data from NOAA's operational COSMIC-II satellite system, also referred to as the GNSS-Radio Occultation (GNSS-RO) system.

COSMIC = Constellation Observing System for Meteorology, Ionosphere & Climate



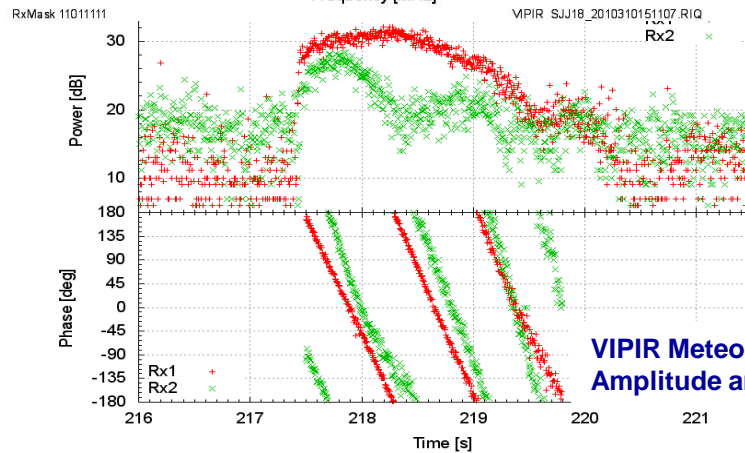
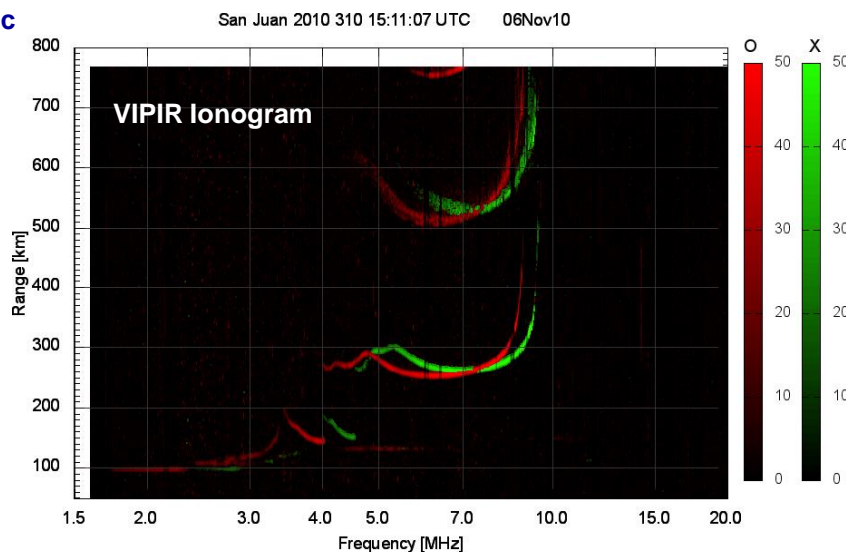
# Accomplishment

## A New Puerto Rico Ionosonde



The Puerto Rico ionosonde station became operational October 2010. Located at the USGS San Juan Magnetic Observatory, the ionosonde consists of a refurbished USAF digisonde to maintain the climate record and a modern VIPIR for research and discovery.

**Vertical Incidence Pulsed Ionospheric Radar (VIPIR) Receive Antennas**





# Accomplishment

## NGDC Executes CORS COOP



Background: The National Geodetic Survey (NGS) is organizationally responsible for the Continuously Operating Reference Stations (CORS). The CORS main facility is located in Silver Spring, MD (CORS-East). The National Geophysical Data Center hosts the parallel CORS facility in Boulder, CO (CORS-West) in accordance with NOAA Continuity Of Operations Plan (COOP).

Incident: On November 10<sup>th</sup>, NGS scheduled a planned transfer of data ingest and distribution operations from Silver Spring to Boulder. Technical issues unexpectedly prevented CORS-East from resuming full functionality on November 15<sup>th</sup> as planned relying, instead, on the capabilities of NGDC to provide assured operations of CORS-West. Resumption of full CORS functionality for CORS-East was delayed until November 23<sup>rd</sup>.

Impact: Continuous operations by CORS-West successfully demonstrated NGS compliance with COOP requirements. External users were minimally impacted whereas full capabilities were maintained for internal NOAA users within the NWS and OAR.







# OUTLINE

## Solar & Terrestrial Physics Division

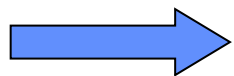


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# Status Update NGDC CLASS Loader

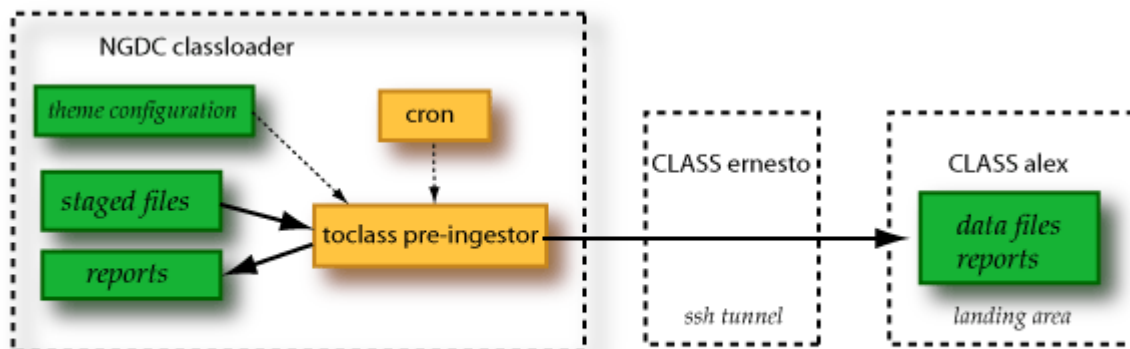
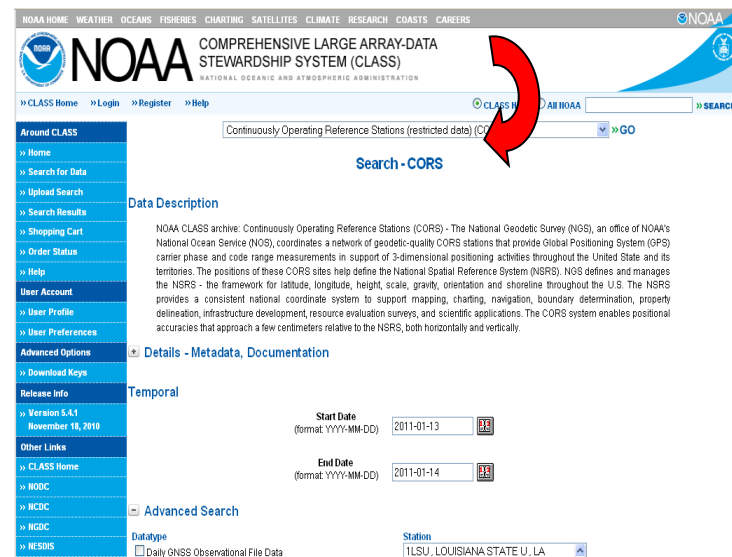


## NGDC classloader status

- Rob Prentice is developing a generic “toclass” application using CORS as the pathfinder
- The CORS team is working with CLASS developers on various “bugs” & change requests
- Once complete CORS ingest testing will begin under a non-public dissemination scenario

## Data Manager Toolkit requirements

- Fran Coloma and Stacy Ziegler are developing requirements for the Data Manager Toolkit



rev 001 01/07/2011

Additional Information: [https://intranet.ngdc.noaa.gov/wiki/index.php?title=Toclass: NGDC-to-CLASS PreIngest](https://intranet.ngdc.noaa.gov/wiki/index.php?title=Toclass:_NGDC-to-CLASS_PreIngest) )

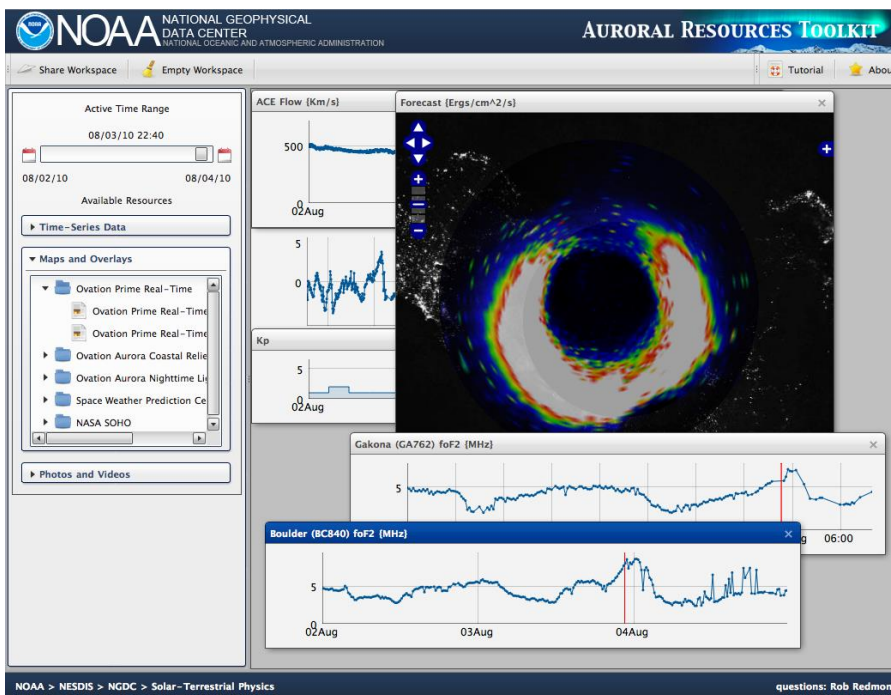
# Status Update

## Auroral Resources Toolkit – AGU Demo

### Visualization & collaboration of auroral phenomenology

- Purpose – Create, view, share and download space weather data for arctic region (aurora)
- Technique – Seamless visualization of internal & external VxO datasets
- AGU Field Testing – Well received during test marketing at the 2010 Fall AGU meeting

**Near Term Plans – Add more datasets & resources. Respond to “market survey”.**



Link: <http://spidr.ngdc.noaa.gov/art/>

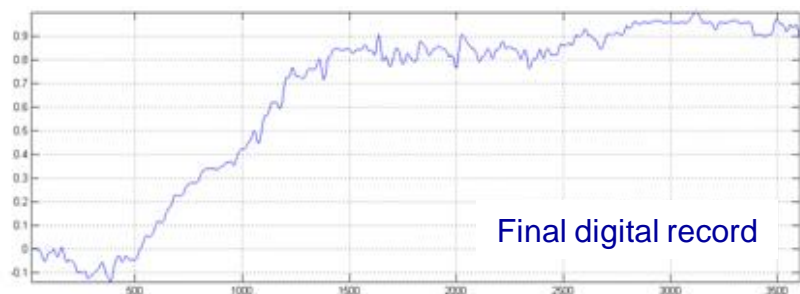
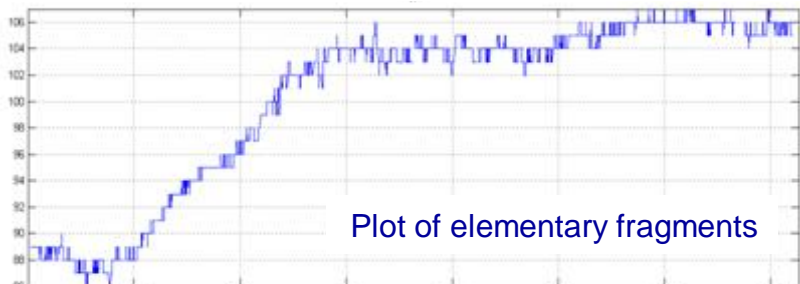


# Status Update

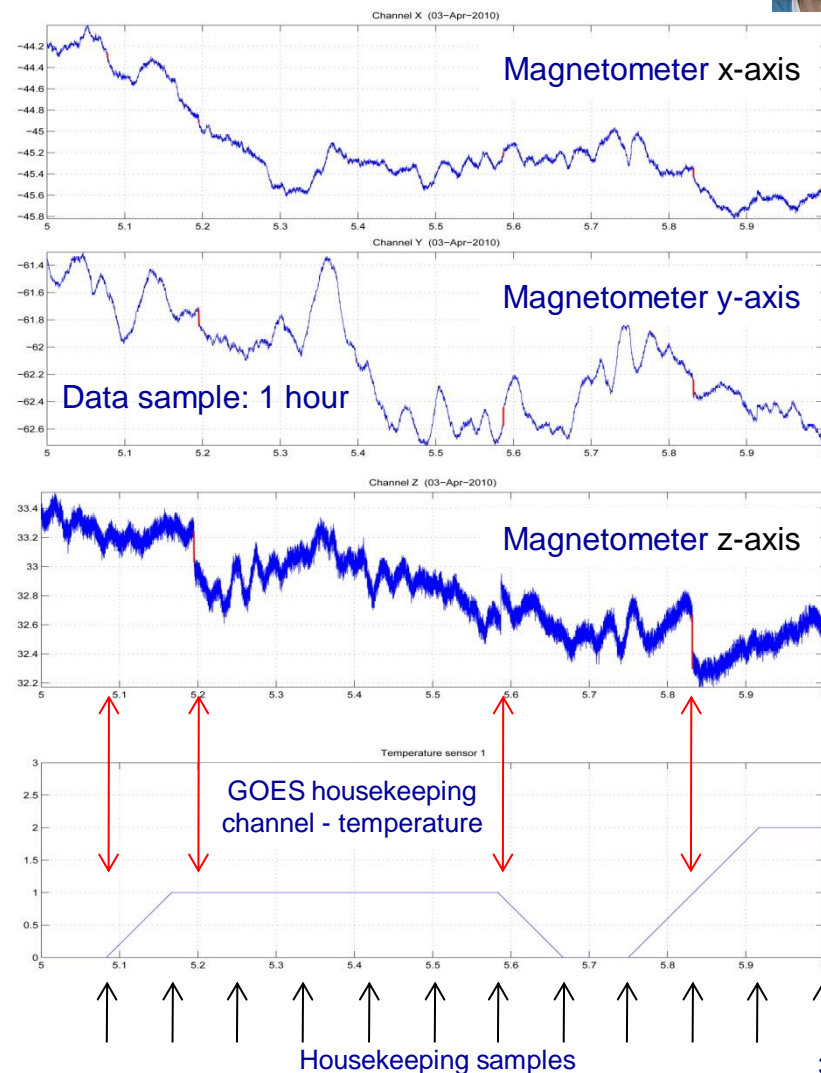
## Russian Visit – Anatoly Soloviev



Digitizing and correcting Russian  
geomagnetic observatory records – J. Mabie



Correcting offsets in GOES  
magnetometer data – Howard Singer





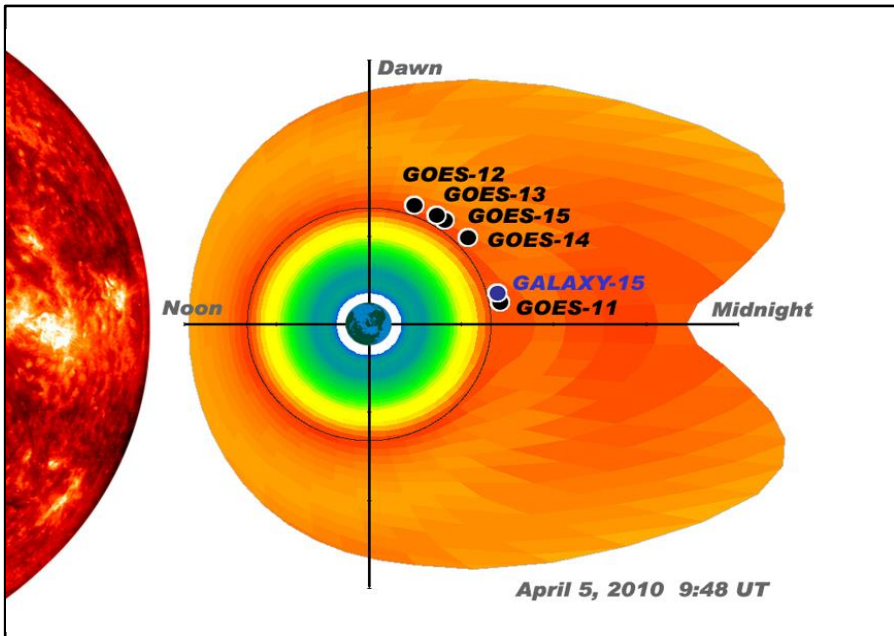


# Special Interest Item

## The Reincarnation of Galaxy 15



**Intelsat Regains Control of Galaxy 15** – On April 5, 2010 the Galaxy 15 geostationary communications satellite suffered an anomaly that severely affected satellite operations and posed a threat to neighboring satellites from uncontrolled radio-wave interference. Subsequently on 23 December, power from the Galaxy 15 battery completely drained during its loss of earth lock and the satellite command unit reset as it was designed to do. Shortly thereafter Galaxy 15 began accepting commands and Intelsat engineers began receiving telemetry in the Satellite Operations Center. A NOAA space environmental assessment found that at the time of the anomaly Galaxy 15 was at increased risk of electrostatic discharge due to heightened space weather. Orbital Sciences' final report is due out later this month.





# Special Interest Item

## Space Environment Monitor – Next (SEM-N)

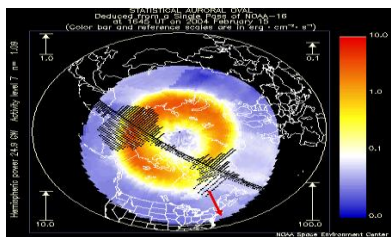


NGDC is developing an MOU with the USAF Space & Missiles Systems Center (SMC) for the continued development of the SEM-N ground processing algorithms. SEM-N is currently manifested on the **Defense Weather Satellite System (DWSS)** and is an objective sensor designated for JPSS-2. Algorithm development program is currently in the post-PDR phase. Prototype algorithms have been adapted and tested within an **Algorithm Development Language (ADL)** environment. SEM-N provides continuity of space particle radiation monitoring for DMSP and POES/MetOp.

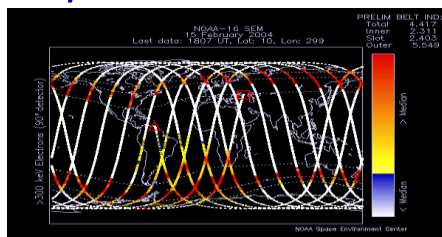


### Space Environmental Data Products

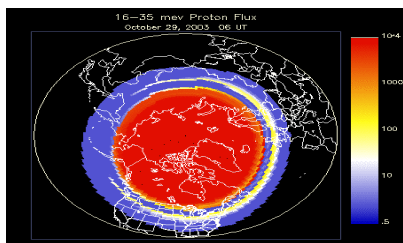
#### Statistical Auroral Oval



#### Space Radiation Environment



#### Solar Proton Monitor



**FYI** – Carry-over funding from the NPOESS program was partly used to continue the SEM-N algorithm program in FY11. The DWSS program office intends to defer any SEM-N FY12 funding and to re-start the program in FY13. The NGDC team will disband after the current FY and a future re-start within NOAA would be problematic. ***Loss of key personnel is a high risk item for the program.***



# **OUTLINE**

## **Solar & Terrestrial Physics Division**



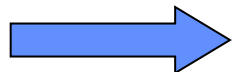
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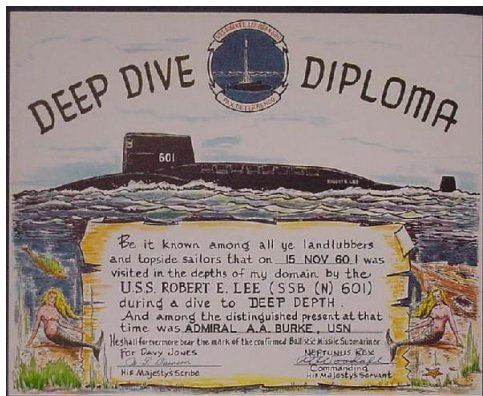
**Space Weather Deep Dive**

**Issues & Summary**



# Deep Dive

## NGDC Space Weather Program



- **Background** – During 4QFY10 a series of programmatic “deep-dives” were conducted for the NGDC space weather (SWx) program

- **Rationales:**

- Establish technology baseline for the NGDC SWx program
- Enable each data manager to fully lay-out their respective technology area
- Assist in determining a path forward for the SWx program

- **Format:**

- Review data sources and “value-added” contributions
- Identify NOAA datasets and other unique datasets at risk
- Discuss designated user community and level of interaction
- *Use the metadata records within the NMMR as the organizing driver for the presentation*

- **Review Dates (each ~4 hours):**

9/29	Geomagnetic Data Services	Justin Mabie
10/27	Ionospheric Data Services	Rob Redmon
11/03	Satellite Data Services	Dan Wilkinson
11/19	Solar Data Services – Part 1	Ed Erwin
12/21	Solar Data Services – Part 2	Ed Erwin



# Deep Dive

## Geomagnetic Data Services



**Background** – NGDC and predecessor organizations have had a long history in geomagnetic observations and data management dating back to the days of the Coast & Geodetic Survey (CGS). In the mid 1970's responsibility for magnetic observations was transferred to the USGS whereas the data management functions remained within NOAA.

### **Strengths:**

- Existing congressional mandate to archive global geomagnetic data – PL 373-504
- Re-engaging with community after years of passive neglect – Metadata / Inventory
- Well organized independent body (INTERMAGNET) provides global leadership
- Volumes of historical records on paper and microfiche – ongoing CDMR recovery effort
- Monthly Geomagnetic Bulletin provides convenient magnetic indices lookup – SPIDR

### **Weaknesses:**

- Rationale for ground-based magnetic data being supplanted by available satellite data
- NGDC's toehold as a major data provider is weak – current staffing levels cannot compete with other World Data Service (WDS) organizations – Edinburgh & Kyoto
- INTERMAGNET severely undercuts any unique contributions for magnetic observatory data collection and quality control although NGDC still retains an archive function
- NGDC has no fundamentally unique role in providing geomagnetic indices – except  $A_p^*$





# Deep Dive

## Ionospheric Data Services



**Background** – NGDC’s ionospheric roots can be directly traced back to the earliest days of the organization. NGDC played a key role in leading the 1957-58 International Geophysical Year (IGY) efforts to monitor the global ionosphere by developing and deploying ionosondes. Available historical ionosonde datasets extend to pre-WWII periods. Other data services include DMSP space plasma observations (also included under satellite data services), aurora morphology and scintillation forecasts, US-TEC and D-region absorption, auroral resources page.

### **Strengths:**

- NGDC recognized as a world leader in ionosonde data collection, QC and research
- Ionosondes provide very accurate bottom-side ionospheric profiles – V&V / Climatology
- Area supports a robust real-time capability for the USAF Weather Agency – GAIM
- Ionospheric group continues to build a robust suite of scientific data services
- Data manager poised to assume Center responsibilities for NOAA’s GNSS-RO data

### **Weaknesses:**

- Niche community limited by a wide diversity of ionosonde capabilities, formats & access
- In spite of recent instrument improvements ionosondes remain largely a relic of the past
- Ionosonde data interpretation dependent on latitude, instrument type & heritage (tech)
- Unlikely that NGDC’s full analog holdings will be digitally available anytime soon – multi-decade CDMP project



# Deep Dive

## Satellite Data Services



**Background** – NGDC's records consist of a contiguous set of space environmental measurements of the geostationary (GOES) and LEO (POES/MetOp) environments dating back to NOAA's first operational environmental satellites in the late 1970's. Records also include USAF satellite space weather data from DMSP (1983 to present)<sup>1</sup>.

### Strengths:

- Contiguous record of the space environment from <1980 to present – all data online
- Future GOES-R plus NOAA initiatives (DSCOVR & GNSS-RO) ensure stable tech base
- Inherent value of retrospective operational data for heliophysics research & climate
- Conversion of NOAA and USAF data to standard format increases value – netCDF

### Weaknesses:

- Single data manager represents a high programmatic risk – effectiveness & continuity
- Current processed data availability and metadata support solely dependent on SWPC
- Quality of the data record limits utility of the data for scientific research and engineering
- No capability to reprocess data in-house – high-res GOES I-M data records unavailable
- Limited in-house instrument expertise to support scientific data stewardship functions

<sup>1</sup>Bill Denig/Rob Redmon manage this dataset



# Deep Dive

## Solar Data Services



**Background** – During the mid to late 1960's the national archive responsibility for solar data (and various other data-types) was transferred from the various World Data Centers to NGDC. Related technical sub-areas under the solar program include cosmic rays, auroral records, airglow, noctilucent clouds, . . .

### **Strengths:**

- Reformats NOAA/SWPC coded messages into tabular format with QC – flares, sunspot group numbers, synoptic drawings – considered a NOAA environmental dataset
- Includes USAF data received through SWPC and from AFWA field sites directly
- Publishes the monthly Solar Indices Bulletin from multiple external sources – SPIDR

### **Weaknesses:**

- Few remaining ground solar observatories – mostly satellite-based – except for ATST
- Lots of “cats & dogs” datasets – some available elsewhere – others unique; Wendelstein
- Publishing a NGDC sunspot number prediction (SSN) separate from SWPC is confusing
- Limited metadata records available – few of the on-line datasets are properly archived



# Deep Dive Next Steps



## Steps to a new STP:

- Develop a “2-to-5 year” plan for a more NOAA-centric and service-oriented STP
  - Identify technical areas for increased and decreased emphasis
  - Brief NGDC senior leadership – Target date: mid-February
  - Public release: Space Weather Workshop, SPA Newsletter, Solar News, etc
  - Re-purpose current work force and recruit/hire personnel as needed
  - Realign mission functions – absorb new capabilities / divest old functions
- 

## The future STP (*draft*):

**Mission** – *To be the Nation’s steward of retrospective operational space environmental data and information*

**Vision** – *An informed society reliant on accurate and effective historical space weather data for emergency planning, environmental specifications and heliophysics research*

**Goal** – *Ensure that NGDC is the authoritative provider of high-quality, accessible, historical space environmental datasets derived from the Nation’s operational space weather services*



# OUTLINE

## Solar & Terrestrial Physics Division



**STP Program Overview**

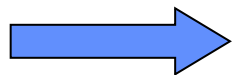
**Milestones & Performance Measures**

**Awards & Personal Achievements**

**Accomplishments**

**Special Interest Items**

**Space Weather Deep Dive**



**Issues & Summary**





# Issues & Summary

## Meetings – 4QFY10 / 1QFY11



### Supported Meetings (4QFY10):

- Air Force Research Laboratory – 22 July 2010, Boston, MA (*C. Elvidge*) – Technical Meeting
- Meeting of the Americas (AGU) – 08-12 Aug 2010, Foz do Iguaçu, Brazil (*D. Wilkinson, P. Alken*)
- Network for Sharing Satellite data for Climate Change Research, 06 Aug 2010, Hanoi, Vietnam (*C. Elvidge*)
- 30<sup>th</sup> Asia-Pacific Advanced Network (APAN) – 09-13 Aug 2010, Hanoi, Vietnam (*C. Elvidge*)
- SEM-N Preliminary Design Review (PDR) – 18-19 Aug 2010, Boulder, CO (*Multiple*)
- Spacecraft Charging Technology Conference – 20-24 Sep 2010, Albuquerque, NM (*W. Denig, J. Allen*)
- Institute of Navigation (ION) Global Navigation Satellite Systems (GNSS) Meeting – 20-21 Sep 2010, Portland, OR (*F. Coloma*) – Fran also participate in the 2010 CORS User Forum

### Supported Meetings (1QFY11):

- NOAA Climate Monitoring Summit – 19-20 Oct 2010, Silver Spring, MD (*C. Elvidge*)
- Climate Data Modernization Program (CDMP) Workshop – 09-10 Nov 2010 (*C. Elvidge*)
- Russian Academy of Sciences (RAS) Technical Interchange Meeting – 13-27 Nov 2010, Moscow, Russia (*P. Elespru*)
- US-India Network Enabled Research Collaboration Workshop – 05-07 Dec 2010, Delhi, India (*C. Elvidge*)
- JPSS User Conclave/Customer Face-2-Face – 01-02 Dec 2010, Greenbelt, MD (*P. Purcell, P. Meade*)
- American Geophysical Union (AGU) – 13-17 Dec 2010, San Francisco, CA (*Multiple*)



# Issues & Summary

## Upcoming Meetings – 2QFY11



### Upcoming Meetings (2QFY11):

- National Radio Science Meeting (URSI) – 05-08 Jan 2011, Boulder, CO (*R. Redmon, T. Bullett, P. Elespuru*)
- Algorithm Development Language (ADL) 2.0 Technical Interchange Meeting – 19-20 Jan 2011, Madison, WI (*P. Meade*)
- American Meteorological Society (AMS) – 23-27 Jan 2011, Seattle, WA (*W. Denig, E. Erwin*)
- Artificial Intelligence in the Earth's Magnetic Field Study, 26-28 Jan 2011, Uglich, Russia (*J. Mabie*)
- NRC Decadal Survey R2O-O2R Working Group Meeting – 07-08 Feb 2011, Irvine, CA (*W. Denig*)
- JPSS Users' Meeting – 09-10 Feb 2011, Aurora, CO (*P. Purcell, P. Meade, W. Denig*)
- 31<sup>th</sup> Asia-Pacific Advanced Network (APAN) – 21-24 Feb 2011, Hong Kong, China (*C. Elvidge*)
- Chapman Conference: Relationship between Auroral Phenomenology and Magnetospheric Processes – 27 Feb – 04 Mar 2011, Fairbanks, AK
- Boulder Solar Day Workshop, 18 Mar 2011, Boulder CO (*W. Denig*)
- Hokkaido University (Invited Lectures) – 14-16 Mar 2011, Hakodate, Japan (*C. Elvidge*)
- DMSP Users Workshop – 18 Mar 2011, Tsukuba, Ibaraki Prefecture, Japan (*C. Elvidge*)



# Issues & Summary



## STP FY10 Publications – Page 1 – Total: 22

- Alken, P.** and S. Maus (2010), Relationship Between the Ionospheric Eastward Electric Field and the Equatorial Electrojet, *Geophys. Res. Lett.*, 37, doi: 10.1029/2009GL041989.
- Alken, P.** and S. Maus (2010), Electric Fields in the Equatorial Ionosphere Derived from CHAMP Satellite Magnetic Field Measurements, *J. Atmos. Sol. Terr. Phys.*, 72, 319–326, doi: 10.1016/j.jastp.2009.02.006.
- Alken, P.** (2009), A Quiet Time Empirical Model of Equatorial Vertical Plasma Drift in the Peruvian Sector Based on 150 km Echoes, *J. Geophys. Res.*, 114, doi: 10.1029/2008JA013751.
- Allen, J.** (2010), The Galaxy 15 Anomaly: Another Satellite in the Wrong Place at a Critical Time, *Space Weather*, 8, 10.1029/2010SW000588.
- Allen, J.H.** and **D. Wilkinson** (2010), Spacecraft Charging: Now and Then, Proc. of the 11<sup>th</sup> Spacecraft Charging Technology Conference, 20-24 September 2010, Albuquerque, NM.
- Aubrecht, C., M. Jaiteh, A. de Sherbinin, T. Longcore, and **C. Elvidge** (2010), A Call for Urban Lighting Governance in the Vicinity of Protected Areas, Proc. of BiodiverCities 2010 - An international conference of the Urban Protected Areas Network, Paris, France, 06-08 September 2010.
- Aubrecht, C., P. Rodrigues, A. Gil, **C. Elvidge**, T. Longcore (2010), SOS Call from Nature - Observing Effects of Artificial Night Lighting on Marine Birds on the Azores, Proc. of Darksy 2010: 10th European Symposium for the Protection of the Night Sky, Kaposvár, Hungary, 02-04 September 2010.
- Bhaneja, P.**, G.D. Earle, R.L. Bishop, **T.W. Bullett**, **J. Mabie**, and **R. Redmon** (2009), A Statistical Study of Midlatitude Spread F at Wallops Island, Virginia", *J. Geophys. Res.*, 114, A04301, doi:10.1029/2008JA013212.
- Buaba, R., **E. Kihn**, M. Gebril, A. Homaifar, and M. Zhizhin (2009), Locality Sensitive Hashing for Satellite Images using Texture Feature Vectors", IEEE Aerospace Conference Proc., Nov 2009.
- Denig, W.F.**, J.C. Green, **D.C. Wilkinson**, J.V. Rodriguez, H.J. Singer, T.M. Loto'aniu, D.A. Biesecker, W. Murtagh and F.J. Rich (2010), Space Weather Conditions at the Time of the Galaxy 15 Spacecraft Anomaly, Proc. of the 11<sup>th</sup> Spacecraft Charging Technology Conference, 20-24 September 2010, Albuquerque, NM.
- Elvidge, C.D.**, **K. Baugh**, **B. Tuttle**, **D. Ziskin** and **T. Ghosh** (2009), Satellite Observation of Heavily Lit Fishing Boat Activity in the Coral Triangle Region, Proc. 30th Asian Conference on Remote Sensing, 18-23 October 2009, Beijing, China.
- Elvidge, C.D.**, D.M. Keith, **B.T. Tuttle** and **K.E. Baugh** (2010), Spectral Identification of Lighting Type and Character, *Sensors 2010*, 10, 3961-3988, doi:10.3390/s100403961.
- Fischman, D., **W.F. Denig** and **D. Herzog** (2009), A Proposed Metadata Implementation for Magnetic Observatories, Proc. of the XIII<sup>th</sup> IAGA Workshop on Geomagnetic Observatory Instruments, Data Acquisition and Processing, Ed. J. Love, U.S. Geological Survey Open-File Report 2009-1226, 82-85.



# Issues & Summary

## STP FY10 Publications – Page 2 – Total: 22



Gebril, M., **E. Kihn**, R. Buaba, A. Homaifar and M. Zhizhin (2009), Structural Indexing of Satellite Images using Texture Feature Extraction for Retrieval, IEEE Aerospace Conference Proceedings, Nov 2009.

**Ghosh, T.**, R.L. Powell, S. Anderson, P.C. Sutton and **C.D. Elvidge** (2010), Informal Economy And Remittance Estimates of India Using Nighttime Imagery, *International Journal of Ecological Economics & Statistics*, 17, pp. 16-50.

**Herzog, D.C.** (2009), The Effects of Missing Data on Mean Hourly Values, Proc. of the XIII<sup>th</sup> IAGA Workshop on Geomagnetic Observatory Instruments, Data Acquisition and Processing, Ed. J. Love, U.S. Geological Survey Open-File Report 2009-1226, 116-126.

Matsumura, K., R.J. Hijmans, Y. Chemin, **C.D. Elvidge**, K. Sugimoto, W.B. Wu, Y.W. Lee and R. Shibasaki (2009), Mapping the Global Supply and Demand Structure of Rice, *Sustainability Science*, 4, pp. 301-313, doi: 10.1007/s11625-009-0077-1.

Nghiem, S.V., D. Balk, E. Rodriguez, G. Neumanna, A. Sorichetta, C. Small and **C.D. Elvidge** (2009), Observations of Urban and Suburban Environments with Global Satellite Scatterometer Data, *ISPRS Journal of Photogrammetry and Remote Sensing*, 64, pp. 367-380.

Soloviev, A. A., Sh. R. Bogoutdinov, S. M. Agayan, A. D. Gvishiani, and **E. Kihn** (2009), Detection of Hardware Failures at INTERMAGNET Observatories: Application of Artificial Intelligence Techniques to Geomagnetic Records Study, *Russ. J. Earth Sci.*, 11, ES2006, doi:10.2205/2009ES000387.

Sutton, P. C., A. Goetz, S. Fildes, C. Forster and **T. Ghosh** (2009), Darkness on the Edge of Town: Mapping Urban and Periurban Australia Using Nighttime Satellite Imagery, *The Professional Geographer*, 62, pp. 119-133.

Sutton, P. C., S.A. Anderson, **C.D. Elvidge**, **B.T. Tuttle** and **T. Ghosh** (2009), Paving the Planet: Impervious Surface as Proxy Measure of the Human Ecological Footprint, *Progress in Physical Geography*, 33, pp. 510-527, doi: 10.1177/0309133309346649.

**Ziskin D.**, **C. Elvidge**, **K. Baugh**, **B. Tuttle** and **T. Ghosh** (2010), The Night Time Lights of Urban Areas, *MEGAPOLI Project News Letter*, 6, pp. 32.





# Issues & Summary

## STP FY11 Publications – YTD: 13



- Aubrecht, C., M. Stojan-Dolar, A. de Sherbinin, M. Jaiteh, T. Longcore, and **C. Elvidge** (2010), "Lighting governance for protected areas and beyond – Identifying the urgent need for sustainable management of artificial light at night", *Earthzine*, IEEE, 20 December 2010.
- Denig, W.**, D. Cooke, and D. Ferguson (2010), Spacecraft Charging and Mitigation, *Space Weather*, 8, S10007, doi:10.1029/2010SW000632.
- Eakin, C.M., C.J. Nim, R.E. Brainard, C. Aubrecht, **C.D. Elvidge**, K. Gledhill, F. Muller-Karger, P.J. Mumby, W.J. Skirving, A.E. Strong, M. Wang, S. Weeks, F. Wentz, and **D.C. Ziskin** (2010), "Monitoring Coral Reefs from Space", *Oceanography*, 23, pp 118-133.
- Earle, G.D., **P. Bhaneja**, P.A. Roddy, C.M. Swenson, A. Barjatya, R.L. Bishop, **T.W. Bullett**, G. Crowley, **R. Redmon**, K. Groves, R. Cosgrove and S.L. Vadas (2010), A comprehensive rocket and radar study of midlatitude spread *F*, *J. Geophys. Res.*, 115, A12339, doi:10.1029/2010JA015503.
- Ferguson, D.C., **W.F. Denig** and J.V. Rodriguez (2011), Plasma Conditions During the Galaxy 15 Anomaly and the Possibility of ESD from Subsurface Charging, Proceedings of the 49th AIAA Aerospace Sciences Meeting in Orlando, Florida, 04-07 January 2011.
- Ghosh, T.**, R. Powell, **C.D. Elvidge**, **K.E. Baugh**, P.C. Sutton and **S. Anderson** (2010), "Shedding light on the global distribution of economic activity", *The Open Geography Journal* , 3, 147-160, doi: 10.2174/1874923201003010147.
- Ghosh, T.**, **C.D. Elvidge**, P.C. Sutton, **K.E. Baugh**, **D. Ziskin** and B.T. Tuttle (2010), "Creating a Global Grid of Distributed Fossil Fuel CO2 Emissions from Nighttime Satellite Imagery", *Energies*, 3(12), 1895-1913.
- Newell, P. T., T. Sotirelis, K. Liou, A. R. Lee, S. Wing, J. Green, and **R. Redmon** (2010), Predictive ability of four auroral precipitation models as evaluated using Polar UVI global images, *Space Weather*, 8, S12004, doi:10.1029/2010SW000604.
- Redmon, R. J.**, D. Anderson, R. Caton, and **T. Bullett** (2010), A Forecasting Ionospheric Real-time Scintillation Tool (FIRST), *Space Weather*, 8, S12003, doi:10.1029/2010SW000582.
- Redmon, R. J.**, W. K. Peterson, L. Andersson, E. A. Kihn, **W. F. Denig**, M. Hairston, and R. Coley (2010), Vertical thermal O+ flows at 850 km in dynamic auroral boundary coordinates, *J. Geophys. Res.*, 115, A00J08, doi:10.1029/2010JA015589.
- Small, C., **C.D. Elvidge**, D. Balk and M. Montgomery (2011), Spatial scaling of stable lights, *Remote Sensing of the Environment*, 115, 269-280.
- Sutton, P.C., M.J. Taylor and **C.D. Elvidge** (2010), Using DMSP OLS Imagery to Characterize Urban Populations in Developed and Developing Countries, in "Remote Sensing of Urban and Suburban Areas", *Volume 10*, Part 2, Eds. Rashed, Tarek, Jürgens, Carsten, Springer, 329-348, doi: 10.1007/978-1-4020-4385-7\_17.
- Takahashi, K.I., R. Terakado, J. Nakamura, Y. Adachi, **C.D. Elvidge** and Y. Matsuno (2010), In-use stock analysis using satellite nighttime light observation data, *Resources, Conservation and Recycling*, 55 (2), 196-200, doi:10.1016/j.resconrec.2010.09.008.



# Issues & Summary

## Solar & Terrestrial Physics Division



- Loss of key personnel has a severe mission impact (3QFY10)
- Satellite processing transition from SWPC (4QFY09) – active
- Continuity of solar data services (1QFY09) – STP re-org needed
- ✓ *Refocus of NWS/SWPC Objectives (2QFY08) – NLAI*
- NightSat Mission Concept (1QFY08) – active
- ✓ *NGS Aerial Photography (1QFY08) – NLAI*
- DMSP Data in CLASS (1QFY08) – planned

**Metrics (FY10 - Total)**  
Papers published: 22  
Reports Published: 24  
Papers presented: 55

**Metrics (FY11 YTD)**  
Papers published: 13  
Reports Published: 6  
Papers presented: 21



# QUESTIONS?



# Issues & Summary

## STP FY10 Presentations – Pg 1 – Total: 55



### 30<sup>th</sup> Asian Conference on Remote Sensing, 18-23 October 2009, Beijing, China

- Remote Sensing in the Cause of a Sustainable Society (Keynote), **C.E. Elvidge**.
- Satellite Observation of Heavily Lit Fishing Boat Activity in the Coral Triangle Region (Oral), **C.E. Elvidge, K. Baugh, B. Tuttle, D. Ziskin and T. Ghosh**.

### 3<sup>rd</sup> Annual RASEI Research Symposium, 21 October 2009, Boulder, CO

- Lighting the Sky (Poster), **D. Ziskin, C. Elvidge, K. Baugh, B. Tuttle, T. Ghosh and E Erwin**.

### Workshop on Monitoring North American Geoid Change, 21-23 October 2009, Boulder, CO

- NGS Continuously Operating Reference Stations (CORS) West Facility (Oral), **F. Coloma, F., G. Sella, E. Joynt, R. Prentice and W. Denig**.

### American Geophysical Union (AGU) Fall Meeting, 14-18 December 2009, San Francisco, CA

- An Absence of Equatorial Scintillation Activity Prior to Large Geomagnetic Storms (Oral), SA13B-07, D.N. Anderson and **R.J. Redmon**.
- GNSS Absolute Antenna Calibration at the National Geodetic Survey (Poster), G11B-0645, **A.L. Bilich** and G.L. Mader.
- The Impact of the Virtual Observatories on Space Weather Science, Modeling, and Predictions (Invited), SH54A-04, J.C. Green, R.S. Weigel, **E.A. Kihn** and D. Baker.
- The Intercalibration of the Night Lights Dataset (Poster), IN43B-1157, **D.C. Ziskin, C. Elvidge, K. Baugh, B. Tuttle and T. Ghosh**.
- Ionosphere Scientific Data Stewardship at NGDC (Poster), SA43A-1607, **T.W. Bullett, R.J. Redmon, J. Manley, R. Conkright, E.A. Kihn, K. Prendergast, P. Elespuru, K. Horan, J. Schminky and W.F. Denig**.
- New Observations of Ionospheric Instabilities in the Equatorial Electrojet (Poster), SA23B-1481, **P. Alken** and S. Maus.
- The NOAA Archives of the 21st Century (Oral), IN44A-05, K.S. Casey, J. Relph, **E. Kihn**, J.J. Bates, L. McCulloch, K.R. McDonald and R. Vizbulis.
- A Prototype User Interface for Space and Solar Data - What Will Be Relevant in 2015? (Poster), IN41A-1099, **D.C. Wilkinson** and **A. Sundaravel**.
- The Space Environmental Impact System (Oral), IN34A-04, **E.A. Kihn**.
- Tidal Signatures in Thermospheric and Ionospheric Quantities (Invited), SA41B-04, H. Luhr, M. Rother, B.G. Fejer, K. Haeusler and **P. Alken**.
- Vertical Plasma Flow in Auroral Boundary Coordinates for 1997 (Poster), SM41A-1681, **R.J. Redmon**, W.K. Peterson, L. Andersson, **E.A. Kihn** and **W.F. Denig**.

### 90<sup>th</sup> American Meteorological Society (AMS) Annual Meeting, 17-21 January 2010, Atlanta, GA

- Impacts of Extended Periods of Low Solar Activity on Climate (Poster), Seventh Symposium on Space Weather, **M.J. Niznik** and **W.F. Denig**.
- Status of the Space Environment Monitor for NPOESS (SEM-N) (Poster), 6th Annual Symposium on Future National Operational Environmental Satellite Systems-NPOESS and GOES-R, **W.F. Denig**, T. Sotirelis, V. Grano, R. Hamilton, K. Wolfram, C. Brann and **J. Manley**.





# Issues & Summary

## STP FY10 Presentations – Pg 2 – Total: 55



### NCAR Coffee, 10 March 2010, Boulder, CO

- Vertical Plasma Flow in Auroral Boundary Coordinates for 1997 (Oral), SM41A-1681, **R.J. Redmon**, W.K. Peterson, L. Andersson, **E.A. Kihn** and **W.F. Denig**.

### IDL Users Group, 17 March 2010, Boulder, CO

- IDL Driven Space Physics Modeling and Investigations (Oral), **R. Redmon**, **E. Kihn**, **P. Elespuru**, **M. Zhizhin**, **D. Mishin**, **D. Medvedev**, W.K. Peterson.

### HR GEO User Consultation Workshop (ESA), 14-15 April 2010, Frascati, Italy

- Nighttime lights from a geostationary orbit (Oral), **C.E. Elvidge**.

### Association of American Geographers Annual Meeting, 14-18 April 2010, Washington, DC

- Aladdin's Magic Lamp: Building an Active Calibration Target for the Defense Meteorological Satellite Program Operational Linescan System (Oral), **B. Tuttle**, S. Anderson, P. Sutton, **C. Elvidge**, R. Powell and **K. Baugh**.

### American Society for Photogrammetry (ASPRS), 26-30 April 2010, San Diego, CA

- Nighttime Lights: Current Capabilities and Future Possibilities (Oral), **C.D. Elvidge**.

### 15<sup>th</sup> Annual Space Weather Workshop, 27-30 April 2010, Boulder, CO

- Space Weather Data Stewardship in NOAA (Oral, Invited), **W. Denig**.
- Validation of the Operational D-Region Absorption Prediction (D-RAP) Model at NOAA SWPC (Poster), I-17, **R.A. Akmaev**, **A. Newman**, **M.V. Codrescu**, **C. Schultz**, **E. Nerney** and **H. Sauer**.
- Operating Network of Phase Ionosondes (Poster), I-16, **M. Rietveld**, **N. Zabolin**, **T. Bullett**, **R. Livingston** and **S. Kolesnik**.
- The Space Physics Interactive Data Resource – ReST Web Services (Poster), SW-4, **E. Kihn**, **M. Zhizhin**, **P. Elespuru** and **R. Redmon**.
- A Forecasting Ionospheric Real-time Scintillation Tool (Poster), I-18, **R. Redmon**, **D. Anderson**, **R. Canton** and **T. Bullett**.
- NGDC Ionosphere Program (Poster), I-19, **J. Schminky**, **R. Redmon**, **T. Bullett**, **E. Kihn**, **W. Denig**, **K. Prendergast**, **P. Elespuru**, **J. Manley**, **R. Conkright** and **K. Horan**.
- NGDC Ionosphere Program (Oral, Invited), Workshop to Coordinate Ionospheric Services, **R. Redmon**, **T. Bullett**, **J. Manley**, **E. Kihn**, **P. Elespuru**, **R. Conkright** and **J. Schminky**.

### SWPC Coffee, 30 April 2010, Boulder, CO

- An introduction to new SPIDR features and a sampling of new client applications that use its data (Oral), **P. Elespuru**.

### ESRL Conference, NOAA/ESRL Global Monitoring Annual Conference, 18-19 May 2010, Boulder, CO

- Creating a Global CO<sub>2</sub> grid from Nighttime Lights Imagery (Poster) **Ghosh**, **T.**, **C. D. Elvidge**, **P. C. Sutton**, **K. Baugh**, **B.T. Tuttle** and **D. Ziskin**.
- A Sixteen Year Record of Global Natural Gas Flaring Derived From Satellite Data (Oral), **C.D. Elvidge**, **D. Ziskin**, **K. Baugh**, **B. Tuttle** and **T. Ghosh**.



# Issues & Summary

## STP FY10 Presentations – Pg 3 – Total: 55



### ESRL Conference, NOAA/ESRL Global Monitoring Annual Conference, 18-19 May 2010, Boulder, CO (continued)

- Radiance Calibrated Night Lights Products that Reveal Urban Cores and Gas Flares (Oral), **D. Ziskin, C. Elvidge, K. Baugh, B. Tuttle, T. Ghosh** and **E. Erwin**.
- Hyperspectral Infrared Imager (HyspIRI) - A Sensor Optimized for Tracking Earth Surface Processes for Climate Analysis (Poster), **C. Elvidge**.

### Solar Radiation and Climate Experiment (SORCE) Science Meeting, 19-21 May 2010, Keystone, CO

- Implications of comparison of Physical Model Simulations and Data During the Last Solar Minimum (Oral), E. Araujo-Pradere, T. Fuller-Rowell, M. Fedrizzi, **R. Redmon**, M. Codrescu and R. Viereck.

### Beacon Satellite Symposium, 07-11 June 2010, Barcelona, Spain

- The Absence of Equatorial Scintillation Activity Prior to a Large Geomagnetic Storm (Oral), D. Anderson, **R. Redmon**, **T. Bullett**, R. Cayton and J. Retterer.

### Space Technology and Geoinformation for Sustainable Development, 14-17 Jun 2010, Cairo, Egypt

- Analysis of Urban Growth and Electrification in North Africa Using Satellite Observed Nighttime Lights Data (Oral), **C.D. Elvidge**.

### Coupling, Energetics and Dynamics of Atmospheric Regions (CEDAR) Workshop, 20-25 June 2010, Boulder, CO

- The Equatorial Electrojet (Invited), **P. Alken**.

### Scientific Assembly of the Committee on Space Research (COSPAR), 18-25 July 2010, Bremen, Germany

- Global View of O+ Outflow in Dynamic Auroral Boundary Coordinates (Invited), **R.J. Redmon**, W.K. Peterson, L. Andersson, **E. Kihn**, **W. Denig**, M. Hairston and R. Coley.

### 30<sup>th</sup> Asia-Pacific Advanced Network (APAN) – 09-13 August 2010, Hanoi, Vietnam

- Satellite Observed Nighttime Lights of Vietnam: 1992-2010 (Oral), **C. Elvidge**.
- Methods Used For the 2009 Stable Lights (Oral), **K. Baugh, C. Elvidge, D. Ziskin** and **T. Ghosh**.
- Methods Used For the 2006 Radiance Lights (Oral), **D. Ziskin, K. Baugh**, F.C. Hsu, **C. Elvidge** and **T. Ghosh**.
- Spatial Distribution of Rice Agricultural Land and Its Change by Night Time Light Data (Oral), K. Matsumura and **C. Elvidge**.
- Estimating the Information and Communication Technology Development Index (IDI) using nighttime satellite imagery (Oral), **T. Ghosh**, P. Sutton and **C. Elvidge**.
- Steel Stock Estimation for Building and Civil Construction by Satellite Image (Oral), F.C. Hsu, Y. Matsuno, and **C.D. Elvidge**.
- A 2010 Mapping of the Constructed Surface Area Density for S.E. Asia - Preliminary Results (Oral), P. Sutton, **C. Elvidge**, B.T. Tuttle, **D. Ziskin, K. Baugh** and **T. Ghosh**.
- A Sixteen Year Record of Gas Flaring Volume Estimates for S.E. Asia (Oral), **C. Elvidge, D. Ziskin, K. Baugh** and **T. Ghosh**.
- Disaggregation of national fossil fuel CO<sub>2</sub> emissions using a global power plant database and DMSP nightlight data (Oral), T. Oda, S. Maksyutov and **C. Elvidge**.



# Issues & Summary

## STP FY10 Presentations – Pg 4 – Total: 55



### Meeting of the Americas, 08-12 August 2010, Foz do Iguaçu, Brazil

- Public Access to NOAA's Historic POES and GOES Space Weather Data (Poster), SH33F-04, **D.C. Wilkinson**.

### BiodiverCities 2010 - An international conference of the Urban Protected Areas Network – 06-08 September 2010, Paris, France

- A Call for Urban Lighting Governance in the Vicinity of Protected Areas (Oral), C. Aubrecht, M. Jaiteh, A. de Sherbinin, T. Longcore and **C. Elvidge**.

### 10th European Symposium for the Protection of the Night Sky – 02-04 September 2010, Kaposvár, Hungary

- SOS Call from Nature - Observing Effects of Artificial Night Lighting on Marine Birds on the Azores (Oral, Invited), C. Aubrecht, P. Rodrigues, A. Gil, **C. Elvidge** and T. Longcore.

### 11<sup>th</sup> Spacecraft Charging Technology Conference, 20-24 September 2010, Albuquerque, NM

- GOES-R Moments and Spacecraft Charging Algorithm and Application to Anomaly Studies (Poster), J.V. Rodriguez, J.C. Green1, T.G. Onsager, T.M. Loto'aniu, H.J. Singer, M. Shouldis, S. Hill and **W.F. Denig**.
- Satellite Charging Applications from the Particle and Field Instruments on the NOAA Satellites (Poster), J.C. Green, J.V. Rodriguez, T.C. Onsager, H.J. Singer, T.M. Lotoniu, **W.F. Denig**, D. Biesecker, J. Kunches and R. Rutledge.
- Solar-Terrestrial Activity Affecting Systems in Space and On Earth (Oral; Invited), J.H. Allen and **D.C. Wilkinson**.
- Space Weather Conditions at the Time of the Galaxy 15 Spacecraft Anomaly (Oral), **W.F. Denig**, J. Green, H. Singer, **D. Wilkinson**, D. Biesecker, W. Murtagh, J. Rodriguez and P. Lotoaniu.



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### CIRES Innovative Research Program, XX November 2010, Boulder, CO

- Passive Radio Imaging in Water Resource Management, Glaciology and Space Weather Monitoring (Poster), N.A. Zabotin, G. Godin and **T.W. Bullett**.

### Space Research Institute of the Russian Academy of Science, 10 November 2010, Moscow, Russia

- Web Service Access to NOAA/NGDC Space Weather Data (Oral), **P. Elespuru**.
- Overview of the Colorado Student Space Weather Experiment (CSSWE) CubeSat Satellite (Oral), **P. Elespuru**.

### International School for Atmospheric Radars, 15-26 November 2010, Chung-Li, Taiwan

- High Frequency Radars and Ionospheric Sounding (Invited Lecture), **T. Bullett**.

### US-India US-India Network Enabled Research Collaboration Workshop, 05-07 December 2010, New Delhi, India.

- Potential for Expanded Exchange of Earth Observation Satellite Data for Climate, Weather and Environmental Studies (Oral), **C.E. Elvidge**.

### Indian Space Research Organization (ISRO) National Remote Sensing Centre, 09 December 2010, Hyderabad, India

- Nighttime Lights of India: 1992-2010 (Oral), **C.E. Elvidge**.

### Indian Space Research Organization (ISRO) Space Science Institute, 10 December 2010, Trivandrum, India

- Nighttime Lights of India: 1992-2010 (Oral), **C.E. Elvidge**.

### Loreta College, 13 December 2010, Kolkata, India

- Nighttime Lights of India: 1992-2010 (Oral), **C.E. Elvidge**.

### Presidency College, 13 December 2010, Kolkata, India

- Nighttime Lights of India: 1992-2010 (Oral), **C.E. Elvidge**.

### American Geophysical Union (AGU) Fall Meeting, 13-17 December 2010, San Francisco, CA

- A global view of O+ upwelling and outflow rates between DMSP and POLAR (Poster), SM33B-1894, **R.J. Redmon**, W.K. Peterson, L. Andersson, E.A. Kihn and **W.F. Denig**.
- A Prototype Web-based system for GOES-R Space Weather Data (Poster), IN43A-1374, **A. Sundaravel** and **D.C. Wilkinson**.
- Auroral Resources: Dataset Access and Interactive Visualization (Poster), IN43A-1395, **P. Elespuru**, **R.J. Redmon**, E.A. Kihn, M. Zhizhin and D. Medvedev.
- Current Operations and Future Plans for Forecasting Products Based on NOAA LEO Satellite Observations (Oral), SM54A02, J.C. Green, J.L. Machol, **W.F. Denig**, R.A. Viereck, R. Rutledge and J. Kunches .



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### American Geophysical Union (AGU) Fall Meeting, 13-17 December 2010, San Francisco, CA – Continued

- Enhancing Natural Hazards Data with Photographs (Poster), IN33B1304, H.L. McCullough, J.D. Varner and **R.J. Redmon**.
- Gas Flaring Volume Estimates with Multiple Satellite Observations (Poster), A43D-0271, **D.C. Ziskin, C. Elvidge, K. Baugh, T. Ghosh** and F.C. Hsu.
- Multipoint Observations of the Large Substorm Associated with the Galaxy 15 Anomaly (Oral), SM22B-05, H.J. Singer, P.T. Loto'aniu, J.C. Green, J.V. Rodriguez, B.J. Anderson, J.J. Love, V. Angelopoulos, D.N. Baker, M.G. Connors, **W.F. Denig**, E.F. Donovan, O. LeContel, T.G. Onsager, T. Nagatsuma, A. Runov and E.L. Spanswick.
- New Operational Algorithms for Particle Data from Low-Altitude Polar-Orbiting Satellites (Poster), SM51A-1766, J.L. Machol, J.C. Green, J.V. Rodriguez, T.G. Onsager and **W.F. Denig**.
- New Products from New Satellites - GOES NOP Satellite Series Space Weather Data and Their Archive for Retrospective Access (Poster), SM51A-1767, **D.C. Wilkinson**.
- NGDC Geomagnetic Observatory Holdings (Poster), GP11A-0749, **J.J. Mabee**.
- Space Weather Conditions at the Time of the Galaxy 15 Spacecraft Anomaly (Oral, Invited), SH31D03, **W.F. Denig**, J.C. Green, **D.C. Wilkinson**, J.V. Rodriguez, H.J. Singer, P.T. Loto'aniu, D.A. Biesecker and W. Murtagh.
- The Future of Space Environment Monitoring in Low Earth Orbit (Poster), IN31A1271, **W.F. Denig**, M. Bonadonna, K.D. Scro and J.C. Green.